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THE

Psychological Bulletin

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Vol. 19, No. 1. January, 1922.

THE PSYCHOLOGICAL BULLETIN

1. GENERAL

1. FLETCHER, J. M., Geneticism as a Heuristic Principle in Psychology. *J. of Philos.*, 1921, 18, 421–433.

The chief contention of this paper is that in scientific treatment fact and value should be kept separate. The historical method of interpretation of anything is not to be confused with the value of the thing as independent of history. In psychology historicism is known as geneticism. The logical outcome of a genetic interpretation of psychological facts as well as all vital facts is that all shall be based on mechanical laws. The genetic explanation does not exhaust the underlying facts. At times it may seem to be more logical. Psychologists should be able to sense the infallibility of logic, in the first place. In the next place if they begin to agree to a genetic explanation they must give over to those who work with mechanics only. Then history is one thing and evaluation is another. Value must change with time. A thing may have been once important, valuable but merely running it back in its temporal order cannot just be what we would want. Again we have what may be called analyticism. Titchener's assumption that experiences capable of being "analyzed into organic sensations are complexes of organic sensations," is an illustration of this tendency. It is probably back of the contention for imagelessthought. Lastly psychology has for its chief purpose inquiry into the functional efficiency of mental process and any confusion of fact and value will produce serious consequences.

T. R. GARTH (Texas)

2. SHELDON, W. H., Is the Conservation of Energy Proved of the Human Body? *J. of Philos.*, 1921, 18, 589–600.

Interaction between conscious process and bodily process is more easily believed than parallelism. Experiments cited by the

writer afford no ground for preferring one explanation to another, however interaction appeals to common sense and comports with natural experience as a basis for a view. The philosopher and psychologist need not decamp from the tenability of the view of interaction since such would not necessarily be unscientific. Mind might in exceptional cases produce an amount of energy exceeding the volume of the amount taken in.

T. R. GARTH (Texas)

3. PICARD, M., A Discussion of "Mind Discerned." *J. of Philos.*, 1921, **18**, 701–713.

The writer in discussing a paper in this journal by Professor Woodbridge by the title "Mind Discerned" says he feels the "haunting suggestiveness" of it all. True all kinds of men deal with the same "subject-matter," but there must be a congeniality between the reacting organism and the subject-matter reacted to. Animal bodies are not on a par with objects of study such as bodies having chemical reactions since we cannot predict their total reactions. Emotions and feelings are subject-matter located in time and space but they are evident to individuals by introspection immediately and only mediately as nerve tissue. No supernatural mind is implied when I know a "green" as a "green-sensation" but only as it functions in my reacting organism. Objects, animal bodies and among them human bodies possess a matter and form having characteristics of their own.

T. R. GARTH (Texas)

4. BOND, C., The Position of Psychological Medicine in Medical and Allied Services. *J. Ment. Sci.*, 1921, **67**, 404–449.

The author discusses public interest in mental disorders and the existing legal restictions on the treatment of mental disorders. Under the second subject he takes up the restrictions as to inpatient treatment; the meager extent to which voluntary treatment is permitted; the necessary extension of the system of voluntary admission, especially to county and borough mental hospitals; the absence of legal restrictions upon out-patient treatment; the dependence of legal restriction upon "certifiability" and the difficulty of its definition; the vagueness of alleged "uncertifiability" as a guide to arrangements; and certifiable cases either without volition or hostile to treatment.

He mentions further the need for more propaganda and gives

the outline of the Consultative Council's scheme for the supply of medical and allied service. He discusses the projected local health authority and domiciliary service. Under this second heading he speaks of the relation of general practitioners to psychological medicine; the influence of the general practitioner in promoting mental hygiene; the family doctor and certification; the unnecessary use of existing emergency procedure and the need of improvement in emergency procedure for admission to county and borough mental hospitals.

He follows this with a discussion of institutional services, stating that the primary center should be available for out-patient treatment of mental cases. He enlarges upon the importance of this type of treatment. The secondary center, he says, should be available for mental cases both as out-patients and as in-patients. The university center should provide a psychiatric clinic and thoroughly organized teaching in psychological medicine, as well as treatment facilities.

Institutions for mental disorders must be hospitals in fact as well as in name. Classification of patients is important. Unnecessary institutional customs should be avoided. The dietary should be suitable. There should be freedom of discharge. There must be clinical records and facilities for clinical work. There should be a visiting medical staff and the organization of the resident staff should be given much care and attention. "Fluidity" of service is absolutely necessary.

The author closes by discussing at some length psychological medicine and its relation to the school medical service, to criminology, to industrial hygiene; psychological medicine in the naval and military medical services; and the importance of "health visitors."

R. E. Leaming (Pennsylvania)

5. Dodge, R., A Mirror-recorder for Photographing the Compensatory Movements of Closed Eyes. *J. of Exper. Psychol.*, 1921, 4, 165–174.

Attempts to photograph reactive compensatory eye-movements have hitherto been seriously embarrassed by the technical difficulties of securing records in the dark or from closed eyes. These difficulties, however, are not insuperable. It is possible to place a surface against the eye-lid in such fashion that it will tend to assume a tangential position with respect to the underlying cornea. A

mirror on the reverse side of this surface will reflect a recording beam of light in accordance with the rotation from side to side produced by the passage of the apex of the cornea underneath. The angular displacement of the mirror depends on the angular displacement of the eye, the relationship between the radius of curvature of the cornea and that of the eyeball, the relative position of the mirror with respect to the apex of the cornea, the thickness and stiffness of the intervening lid, and the intercurrent movements of the lid. The recording mirrors are held against the closed lids by light forked, steel bars projecting inward from the sides of a supporting frame secured firmly to the subject's forehead by means of adjustable nose-piece, temple supports, and ear bows. A commercial 100-watt nitrogen-filled incandescent lamp with a horseshoe-shaped filament is a satisfactory source of light for the recording beam. The light from this lamp is reflected to the concave mirrors of the mirror-recorder which, in turn, project the image across the slit of the recording camera.

C. C. Pratt (Clark)

6. Laird, D. A., Apparatus for the Study of Visual After-images. *J. of Exper. Psychol.*, 1921, **4**, 218–221.

Author describes simple device for securing an intense and even illumination from reflecting surfaces covered with colored linings for the purpose of studying positive and negative visual after-images.

C. C. Pratt (Clark)

7. Dunlap, K., An Improvement in Voice Keys. *J. of Exper. Psychol.*, 1921, **4**, 244–246.

Author reports an improvement made in his model of the voice key by means of a contact operated by gravity alone.

C. C. Pratt (Clark)

8. Brahn, M., Wilhelm Wundt und die angewandte Psychologie. *Praktische Psychol.*, 1920, **2**, 1–3.

Die angewandte Psychologie verdankt Wundt die Möglichkeit ihres Daseins; er ist ihr jedoch nicht mehr Führer geworden.

H. Bogen (Berlin)

9. Höfler, A., Meinongs Psychologie. *Zeits. f. Psychol.*, 1921, **86**, 368–374.

Nachruf auf den verstorbenen Psychologen und Analyse seiner Werke.

H. Henning (Frankfurt a/M.)

2. NERVOUS SYSTEM

10. Kramer, F., *Schussverletzungen peripherer Nerven.* 5. Mitteilung *Plexus brachialis. Monatss. f. Psychiat. u. Neurol.*, 1921, **50**, 279–301.

Psychologisch bemerkenswert ist nur die Tatsache, dass bei manchen Plexuslähmungen mit schweren motorischen Ausfallserscheinungen die Sensibilitätsstörungen zuweilen sehr unbedeutend sind.

Th. Ziehen (Halle a.S.)

11. Boer, S. de, Die autonome Innervation des Skelettmuskeltonus. *Arch. f. d. ges Physiol.*, 1921, **190**, 41–53.

Die im Jahre 1913 von de Boer aufgestellte Lehre, dass der Tonus der Skelettmuskeln von sympathischen Nervensystem aus hervorgerufen würde und nicht von den eigentlichen motorischen Nerven des cerebrospinalen Systems, ist von verschiedenen Autoren bekämpft worden. De Boer sucht in der neuen Arbeit nachzuweisen, dass diese Einwände unberechtigt sind. Er stützt sich dabei im Wesentlichen auf seine früheren Versuche.

Bethe (Frankfurt a/M.)

12. Franke, F., Die Kraftkurve menschlicher Muskeln bei willkürlicher Innervation und die Frage der absoluten Muskelkraft. *Arch. f. d. ges. Physiol.*, 1920, **184**, 300–321.

Mit einem von Bethe angegebenen Dynamometer wird die maximale Kraft der Armbeugung und Armstreckung im Ellbogengelenk bei verschiedenen Winkelgraden gemessen. Auf Grundlage von Röntgenbildern werden die Hebellängen bestimmt und daraus die Drehmomente und die entsprechenden Kräfte des Trizeps, Bizeps und Brachialis berechnet. Die Kraftkurven der Muskeln fongen hoch an, steigen noch etwas und fallen schnell ab. Ihr Maximum liegt an andrer Stelle als das der äusseren Kraftkurven (Ausgleich durch Drehmomente). Maximale Kraft des Trizeps bis 448 kg, daraus grösste Kraft pro qcm (absolute Kraft) 17–20 kg; entsprechend beim Bizeps 130 kg und 9–12 kg.

Bethe (Frankfurt a/M.)

13. Steinhausen, W., Ueber die Latenzzeit des Sartorius in Abhangigkeit von der Stromstärke bei Reizung mit konstantem Strom. *Arch. f. d. ges. Physiol.*, 1921, **187**, 26–46.

Abstufung der Reizstromstarke durch Mannit-Porsäure-Widerstände oder mit der Elektronenröhre. Die Latenzzeiten nehmen

mit dem Wachsen der Stromstarke ab. Die Latenzzeiten als Ordinaten zu dem Stromstärken als Abszissen in ein Coordinatensystem eingetragen geben Curven, welche sich als gegen die Axen verschobene Hyperbeln deuten lassen. Verschiedene Möglichkeiten, wie dieses Hyperbelverhältniss zu Stande kommt, werden erörtert.

BETHE (Frankfurt a/M.)

14. PFAHL, Ueber die reziproke Innervation. *Arch. f. d. ges. Physiol.*, 1921, **188**, 298–302.

Nach Pfahl giebt es eine reziproke Innervation antagonistischer Muskeln, wie sie von Sherrington u.a. bei den Reflexen höherer Tiere gefunden wurde, beim Menschen nicht. Die von Bethe an Sauerbruch-Operierten aufgeschriebenen Curven liessen ein reziprokes Verhältniss im mathematischen Sinne nicht erkennen. (Dass eine Reziprozität im mathematischen Sinne vorläge, ist auch nie behauptet worden.) Pfahl schrieb die Bewegungen der Handbeugung und Streckung an Gesunden und an Patienten mit Nervenverletzungen auf. Er glaubt aus denselben schliessen zu können, dass während der Agonist sich sich zusammenzieht, der Antagonist hemmend eingreift.

BETHE (Frankfurt a/M.)

15. MANSFELD, G., Beiträge zur Physiologie der Reizerzeugung. 2. Mitteilung. Darm. 3. Mitteilung. Skelettmuskel. *Arch. f. d. ges. Physiol.*, 1921, **188**, 241–246, 247–253.

Nach einer früheren Untersuchung (Mansfeld u. Szent-Györgyi, Pflügers Archiv. 184, 236, 1920) wird die Kohlensäure als Ursache (innerer Reiz) des Herzschlages angesehen. Hier wird gezeigt, dass der Darm in Lösungen, welche kohlensäurefrei sind und kohlensäurebindende Alkalien enthalten, seine Bewegungen einstellt. Sie kehren nach längerer Latenz in kohlensäurefreier Ringerlösung (durch selbsterzeugte Kohlensäure) oder sofort in kohlensäure-haltiger Ringerlösung wieder. Die Stillstellung soll nicht auf der Gegenwart freier OH-Ionen beruhen, sondern auf dem Fehlen freier Kohlensäure. Ebenso soll die indirekte Erregung von Muskeln ausbleiben, wenn Kohlensäure fehlt; die direkte Erregung soll aber erhalten bleiben.

BETHE (Frankfurt a/M.)

16. Dunn, H. L., The Growth of the Central Nervous System in the Human Fetus as Expressed by Graphic Analysis and Empirical Formulæ. *J. of Comp. Neurol.*, 1921, 33, 405–492.

The material for this elaborate study consisted of 156 human fetuses ranging from 3.1 to 53.6 cm. in total or crown-heel length and were quite evenly distributed between these extremes. By inspection field graphs and preliminary curves of growth were constructed; these were then expressed in terms of empirical formulæ. These values were finally converted from functions of crown-heel length to functions of the age in fetal (lunar) months. Lastly, the relative weights of the various parts of the central nervous system were determined in terms of per cents. of the encephalon. Thus, with the abscissæ representing total body length and the ordinates representing weight and volume in grams (c.c.) the curves of the central nervous system as a whole, the encephalon, cerebral hemispheres, cerebellum, pons and medulla, midbrain, and spinal cord show one type of growth curve which is concave with respect to the ordinate. On the other hand the ratios of diameters and lengths of different parts to total bodily length furnish a straight-line "curve." In all were found four varieties of growth. (1) The cerebral, which is characterized by (*a*) a steady and relatively slow increase in volume from the second to the beginning of the sixth fetal month and a constant and more rapid increase from this time to birth, and (*b*) by a steady and constant growth in linear dimensions from the second fetal month to birth. (2) The brain stem and cord type, which shows a much more rapid growth from the second to the end of the fifth fetal month than it does in the last five months of fetal life. (3) The cerebellum type which proceeds very slowly from the second to the end of the fifth fetal month and then increases tremendously from the sixth month to birth. The compound type which represents the combined effect of two or three or all of the above varieties, predominated by the cerebral type. These types of growth may be expressed in terms of empirical formulæ. These formulæ are presented.

R. H. Wheeler (Oregon)

17. Ping, C., On the Growth of the Largest Nerve Cells in the Superior Cervical Sympathetic Ganglion of the Norway Rat. *J. of Comp. Neurol.*, 1921, 33, 313–338.

This is a continuation of the study reported in No. 3 of the same Volume of the *Jour. of Comp. Neurol.* Certain characteristic

differences were found between the wild and domestic species the interpretation of which awaits data from long-continued domestication and inbreeding of Norways.

R. H. Wheeler (Oregon)

18. Ayers, H., Vertebrate Cephalogenesis. V. Origin of Jaw Apparatus and Trigeminus Complex—*Amphioxus*, *Ammocœtes*, *Bdellostoma*, *Callorhynchus*. *J. of Comp. Neurol.*, 1921, **33**, 339–404.

Evidence tends to show that the jaw apparatus is not phylogenetically related to gills as was supposed and that the jaw apparatus is the end organ of the trigeminus. The matter bids fair to remain controversial until evidence from other investigations is at hand, for the reason that the origin of certain muscles and cartilages and their nerve supply is problematical. The author hopes to meet certain of these objections to his view in a forthcoming contribution.

R. H. Wheeler (Oregon)

19. Detwiler, S. R., and Laurens, H., Studies of the Retina. Histogenesis of the Visual Cells in *Amblystoma*. *J. of Comp. Neurol.*, 1921, **33**, 493–508.

The phylogenetic relation of cones to rods is a matter of vital importance. A difficulty is found in the fact that in certain animal forms structures resembling cones may be rod-like in their functions. Moreover, variability in the shape of the visual cells has made absolute rod and cone distinction a problem in some cases. Evidence from recent and careful study indicates that in amphibia both the rods and cones are differentiated from primitive, non-specialized cells. In the earlier embryonic stages these cells are cone-like in structure. At the age of 15 days true cones are observable.

The results of this study do not bear out Cameron (*J. Anat. and Physiol.*, 1905 and 1911) who regards all of the conical-shaped visual cells in early stages of amphibian development as cones and the latter appearing rods as transformed cones. Differentiated rods are later in appearance than the cones.

The progenitors of rods and cones, while cone-like at the outset, possess characteristic features by which they can be divided into the parent cells of each differentiated type; the parent cells of the rods are larger, their nuclei occupy a more external position

than that of the cones, and the granular material of their outer segments becomes arranged in lamellæ characteristic of the fully differentiated rod. The ratio of these conical-shaped rod progenitors to that of the cones is approximately the same (four to three) as that of the rod-cone ratio in the fully differentiated retina.

R. H. Wheeler (Oregon)

20. Larsell, O., and Mason, M. L., Experimental degeneration of the vagus nerve and its relation to the nerve terminations in the lung of the rabbit. *J. of Comp. Neurol.*, 1921, 33, 509–516.

R. H. Wheeler (Oregon)

3. SENSATION AND PERCEPTION

21. Cobb, P. W., and Loring, M. W., A Method for Measuring Retinal Sensitivity. *J. of Exper. Psychol.*, 1921, 4, 175–197.

Experimental conditions consisted of an illuminated screen with a small circular aperture in the center through which was visible a smaller screen of the same degree of illumination. The falls of a gravity drop-frame immediately in back of the main screen gave variable short changes of illumination in the center of the observer's field of vision. Four variable factors were introduced by the use of two sizes of aperture (13.138 and 18.096 sq. mm.) and by the presence or absence of shadows on the main screen. *O* sat at a distance of 6 m. from the screen.

Under these conditions it was found that the average threshold time, reduced to its equivalent with a standard opening, is about 24 sigma. At this threshold the product of the area of stimulus and time of exposure is constant. The effective time for stimulation is not appreciably altered by the presence of shadows on the main screen. The position of the judgment within a whole series, and the time of day in the course of experimentation seem to be of negligible effect upon the results.

C. C. Pratt (Clark)

22. Jones, E. S., Improvement in Brightness Discrimination and its Bearing on a Behavioristic Interpretation of Perception. *J. of Exper. Psychol.*, 1921, 4, 198–202.

In many current psychological textbooks the nature of perceptual experience is frequently treated without reference to the

reaction phase (*i.e.*, some type of muscular response) of perception. Experiments would seem to indicate, however, that in discriminations of tint and hue, *e.g.*, differences in perception must be explained in terms of reaction. Nearly all the protocols of practiced observers bear witness to the fact that increase in fineness of visual discrimination is conditioned by nice adjustment of muscular response. Perception of differences seems to resolve fundamentally into methods of reacting.

C. C. Pratt (Clark)

23. Newhall, S. M., The Modification of the Intensity of Sensation by Attention. *J. of Exper. Psychol.*, 1921, 4, 222–243.

By way of introduction to the problem of modification of sensory intensity by attention the author presents an admirable summary of attempts to determine empirically the phenomenology of the attentive consciousness, and the theories which treat of intensive change as due to attention.

In the present investigation the experimental set-up consisted essentially of an electromagnetically driven 100 v.d. Koenig fork in one room which served as a source of sound in two telephone diaphragms for *O* in another room. The relative intensities of the two auditory stimuli were controlled by sliding resistances. The experiments were divided into two main groups. In the first group *O* was instructed to judge the position of the binaural phantom while the attentional set conditioned by a previous uniaural stimulation was still operative. The time intervals between uniaural and binaural stimulations, and the intensities of stimulation were varied in different series. In a few trials *O* was allowed to shift his visual fixation from the median plane to the position in which the auditory stimulus was localized. In the second group *O* was instructed to hear-out a given component from a binaural stimulus presented so as to fall within the median plane. With this attentional set still in force, *O* was requested to localize the auditory phantom of the second stimulation. Variations similar to those in the first group were introduced.

The results of the first group of experiments point to a sensory fatigue-effect in the direction of intensive decrease until the interstimulation interval is changed from 1 to 4 seconds, when a recovery-effect in the direction of increase is apparent. Fatigue is greatest at minimal intensities. Eye-movement tends to facilitate recovery from the uniaural fatigue-effect. In the second group of experiments the results would seem to indicate that the hearing-out pro-

cess shifts localization, and hence intensity, in the direction of the set assumed by attention. The results as a whole support those findings in which attention appears effective in increasing the intensity of weak sensations and decreasing the intensity of components abstracted-from.

C. C. Pratt (Clark)

24. Jaensch, E. R., Arbeiten zur Psychologie and Philosophie. *Zeit. f. Psychol.*, 1920, 83, 257–352.

1. Einige allgemeinere Fragen der Psychologie und Biologie des Denkens, erläutert an der Lehre vom Vergleich. Leipzig, J. A. Barth, 1920.

In dieser gedankenreichen, flüssig geschriebenen Untersuchung beleuchtet Jaensch die Krisis in der Philosophie der Gegenwart. Aus dem Flusse der historischen Entwicklung der Wissenschaft und der Situation der Gegenwart heraus erhebt er die Forderung nach intensiver Pflege der Psychologie, der er im System der Wissenschaften eine topologisch zentrale Stellung zuerkannt. Am Beispiel des elementaren Vergleichs zeigt J., wie durch eindringende psychologische Untersuchung grundsätzliche Fragen dem Streite philosophischer Meinungen entzogen und exakter Beantwortung zugeführt werden können. Jaensch begründet unter Abwehr geltend gemachter Bedenken die Lehre von der entscheidenden Bedeutung der Uebergangserlebnisse für den Vergleichsakt durch Versuche an Individuen mit subjektiven optischen Anschauungsbildern, bei denen diese Uebergangserlebnisse besonders deutlich aufzutreten pflegen. Diese Individuen, die unter Jugendlichen sehr stark verbreitet sind, besitzen die Fähigkeit, ein betrachtetes Bild oder ein angeschautes Objekt nach Wegnahme der Vorlage regelrecht wiederzusehen, d.h. mit dem Charakter der Empfindung zu reproduzieren. Das Ergebnis der Untersuchung wird gestützt durch Dressurversuche an Hühnern und durch ergänzende Experimente an 2–5 jährigen Kindern. Diese Art des Vergleichs ist als die ursprüngliche anzusehen. Neben ihr sind auf höherer Entwicklungsstufe noch andere Vergleichsmodi nachweisbar.

O. Kroh (Göttingen)

25. Jaensch, E. R., Ueber den Farbenkontrast und die sogen. Berücksichtigung der farbigen Beleuchtung. *Zeits. f. Sinnesphysiol.*, 1921, 52, 165–180.

Jaensch überträgt in dieser Untersuchung das in den früheren Arbeiten dieser Serie bereits für Helligkeitskontrast und

Helligkeitstransformation angewandte Prinzip der Parallelversuche auf die Erscheinungen des Farbenkontrastes und der Farbentransformation. Er bedient sich bei den Transformationsversuchen der Methode der normalbeleuchteten Aequivalenzscheiben: In der einen Wand eines farbig beleuchteten Raumes befindet sich ein kleiner Ausschnitt, durch den eine homogene, nur von natürlichem Tageslicht beleuchtete rotierende Kreiselscheibe (Infeld) sichtbar ist. Durch einen Hilfversuch beweist Jaensch, dass deren Farbe unter dem Einfluss der farbigen Beleuchtung genau so verändert (transformiert) wird, wie die einer innerhalb des beleuchteten Raumes angebrachten Scheibe, sofern beide Scheiben gleiche Valenzen besitzen. Durch systematische Variation der weissen und farbigen Valenzen jener Scheibe gewinnt er sodann sein Hauptergebnis: Das unter dem Einfluss einer farbigen Beleuchtung (eines farbig beleuchteten Raums) neutral erscheinende Infeld bleibt neutral, wenn seine farbige und seine weisse Valenz proportional wachsen.

O. Kroh (Göttingen)

26. Kroh, O., Ueber Farbenkonstanz und Farbentransformation. *Zeits. f. Sinnesphysiol.*, 1921, **52**, 181–216; 235–273.

Kroh führt die Untersuchungen von Jaensch fort und stellt dabei eine Reihe von Parallelgesetzen für Farbenkontrast und Farbentransformation auf. Er beweist durch quantitative Versuche, dass Farbenkontrast und Farbentransformation (zusammenfassend als Farbenbeeinflussung bezeichnet) gleichen Gesetzen folgen, wenn die kontrasterregende Farbe bezw. die Farbe der Beleuchtung (die beeinflussenden Farben) bezüglich ihrer Sättigung und ihrer Weissvalenz verändert werden. Da bei proportionaler Veränderung der weissen und farbige Valenzen auch hier ein neutral erscheinendes Infeld neutral bleibt, so gewinnt er im Zusammenhang mit dem oben angegebenen Resultat Jaenschs den Invarianzsatz für Farbenbeeinflussung (gültig für Kontrast und Transformation): Gleichungen zwischen neutral erscheinenden Infeldern bleiben bei proportionaler Veränderung aller Valenzen innerhalb weiter Grenzen gültig. Der völlige Parallelelismus zwischen Farbenkontrast und Farbentransformation zeigt sich auch bei Untersuchung der Wirkung gering gesättigter beeinflussender Farben, bei der Untersuchung individueller Differenzen sowie bei Versuchen, in denen der Objektcharakter des Infelds durch Störungen seiner Homogenität gesteigert wird. Hinsichtlich des Grades der Beein-

flussung zeigt sich die Farbentransformation in allen Fällen dem Farben kontrast überlegen. Die Anwendung der gefundenen Resultate zeigt, dass eine ganze Reihe bisher den Kontrastphänomenen zugeordneter Erscheinungen mit Hilfe der Farbentransformation zustande kommt.

Während sich die bisherigen Untersuchungen dieser Serie auf das vollentwickelte Farbensehen des Erwachsenen bezogen, wenden sich die folgenden der Erforschung der unmittelbaren genetischen Vorstufe des vollentwickelten Farbensehens zu. Jene Vorstufe wird dargestellt durch die eidetische Jugendphase (vgl. die Referate über die beiden nächstein Serien).

O. Kroh (Göttingen)

27. Herwig, B., Ueber den inneren Farbensinn bei Jugendlichen und seine Beziehung zu den allgemeinen Fragen des Lichtsinnes. *Zeits. f. Psychol.*, 1921, **87**, 129–210.

Herwig findet: Die Farbenerscheinungen im Anschauungsbild sind den im gewöhnlichen Sehen zu beobachten den qualitativ gleichartig, aber leichter experimentell beeinflussbar und quantitativ ausgesprochener als jene. Dieser Tatbestand kommt in Parallelgesetzen zum Ausdruck, die Herwig bezüglich der Farbenabschwächung, der Induktionswirkungen und des peripheren Sehens (periphere Far benblindheit) aufstellt. Die Untersuchung liefert noch eine Reihe von Nebenergebnissen: 1. Anschauungsbilder können sowohl positive als auch negative Bildfarben aufweisen. (vgl. hierzu die Referate über W. Jaenschs Konstitutionsuntersuchungen.) Typus und Alter des Beobachters, Zeit der Darbietung, Seitlichkeit der Lage und Grösse des dargebotenen Feldes sind massgebend für den Umschlag der positiven in negative Bildfarben. 2. Einige Unterschiede von Anschauungsbild und negativem Nachbild werdenaufgezeigt. 3. Bei Analyse eines Falles von Rotgrünblindheit wird der Einfluss der Gedächtnisfarbe auf das Sehen dieses Farbenblinden erwiesen.

O. Kroh (Göttingen)

28. Jaensch, E. R., Ueber Kontrast im optischen Anschauungsbild. *Zeits. f. Psychol.*, 1921, **87**, 211–216.

Jaensch beobachtete an einer Reihe von Eidetikern (Individuen, die über subjektive optische Anschauungsbilder verfügen) im Anschauungsbilde starke Kontrasterscheinungen. So erschienen z.B. weissliche oder nur schwach farbig getönte Mittelteile von

im übrigen sattfarbenen Blüten völlig oder angenähert komplementär zur vorherrschenden Blütenfarbe, sobald die Beobachter das Anschauungsbild der Blüte bei geschlossenen Augen oder bei Projektion auf neutralem Grund beobachteten. Aber auch dann, wenn die Mitte nicht oder nur unerheblich weniger gesättigt war als die Umgebung, konnte vorübergehend Kontrastfarbe im Anschauungsbild festgestellt werden (gesteigerter Binnenkontrast). Ebenso fand Jaensch in vielen Fällen im Anschauungsbild gesteigerten Randkontrast und zwar zeigten sich hier sehr oft Mehrfachkontrasterscheinungen, derart, dass z.B. der Rand eines hellen Quadrates von einem dunklen Streifen umgeben war, auf den dann nach aussen hin ein hellerer, dann wieder ein dunklerer Streifen folgte.

O. Kroh (Göttingen)

29. Herwig, B., und Jaensch, E. R., Ueber Mischung von objektiv dargebotenen Farben mit Farben des Anschauungsbildes. *Zeits. f. Psychol.*, 1921, **87**, 217–223.

Projiziert ein Eidetiker das Anschauungsbild eines farbigen Quadrates aut ein gleich grosses objektiv dargebotenes andersfarbiges Quadrat, so mischen sich die beiden Farben nach den bekannten Gesetzen der Farbenmischung: Komplementäre Farben ergeben Grau oder eine der beiden Farben in geringerer Sättigung, nichtkomplementäre Farben ergeben dagegen eine beiden ähnliche Mischfarbe. Die Versuche ermöglichten die quantitative Bestimmung des Sättigungsgrades der Anschauungsbilder und lieferten überdies eine objektive Kontrolle für die Angaben jugendlicher Eidetiker sowie einen Beweis für die Realität der Anschauungsbilder. Bei manchen Individuen kamen Wettstreiterscheinungen vor, indem abwechselnd bald die Anschauungsbildfarbe, bald die Objektfarbe überwog.

O. Kroh (Göttingen)

30. Fuchs, W., Untersuchungen über das Sehen der Hemianopiker und Hemiamblyopiker II: Die totalisierende Gestaltauffassung. (Psychologische Untersuchung hirnpathologischer Fälle auf Grund von Untersuchungen Hirnverletzter. *Zeits. f. Psychol.*, 1921, **86**, 1–143.

Diese Arbeit dient der experimentellen Erforschung der Tatsache, dass viele Hemianopiker bei tachistoskopischen Untersuchungen bestimmte "einfache" Figuren (Kreis, Ellipse, Stern u.

ähnl., nicht aber etwa einen einfachen geraden Strich) auch dann *vollständig* zu sehen vermögen, wenn ein Teil der Figuren in die blinde Gesichtsfeldhälfte fällt. Solche Figuren werden von Hemianopikern auch dann noch als *ganze* gesehen, wenn in der blinden Gesichtsfeldhälfte Teile der Figuren objektiv fehlen; so kann man von einem Kreis grosse Partien (bis zur Hälfte) weglassen, ohne der Eindruck eines Ganzkreises zu zerstoren. Lokale Konzentration der Aufmerksamkeit auf die blinde Gesichtsfeldhälfte beeinträchtigt die Entstehung des Ganzeindruckes oder macht sie sogar völlig unmöglich.

Der Verfasser zeight auf experimentellem Wege, dass die hier zu Tage tretende "zentrale Ergänzung" der Figuren nicht, wie man annahm, auf vorstellungsmässiger Ergänzung beruht: Bekanntheit und associative Verknüpfung spielen dabei keine Rolle, wie es unter anderem Versuche an Buchstabenund Wörtern, an Figuren bekannter sinnvoller, Objekte, die alle nicht vollständig gesehen werden können, gezeigt haben. Die letzte Erklärung liefern bestimmte Gestalt-prinzipien (*Max Wertheimer*): es gibt Figuren, die so beschaffen sind, dass die Darbietung eines genügend grossen Teiles von ihnen ausreicht, um einer für den Eindruck der vollständigen Figur nötigen physiologischen Vorgang auszulösen; immer muss aber von dem gebotenen Teil genügend eindeutige Gestaltanregung ausgehen.

Eine ähnliche Tendenz zur Entstehung einer Gesamtgestalt zeigt sich auch bei Versuchen mit negativen Nachbildern, und zwar auch dann, wenn sie im Vorbild ausbleibt, oder nur ein Teil der Figur als Vorbild geboten wird.

Die Untersuchungen führten weiterhin zu einer neuen Deutung der dem Normalen bekannten Tatsache der "Ausfullung" des Sehfeldes am blinden Fleck und an der Fovea im Dämmerungssehen. Auch diesse Ausfullungen erweisen sich als nicht bedingt durch vorstellungsmässige Ergänzung, sondern als Effekte bestimmter, experimentell greifbarer Gestaltbedingungen.

Von den reichhaltigen Ergebnissen sei nur noch erwähnt, dass die Untersuchungen an Hemiamblyopikern wichtige Aufschlusse über Grundphänomene des indirekten Sehens gebracht haben.

A. Gelb (Frankfurt/Main.)

31. Hess, C. von, Die Bedeutung des Ultraviolett für die Lichtreaktion bei Gliederfüssern. *Arch. f. d. ges. Physiol.*, 1921, **185**, 281–310.

Die Bewegungen niederer Krebse (*Polyphemus*, *Daphniden*) werden durch ultraviolettes Licht stark beeinflusst (Aufsuchen grösserer Lichtintensitat, wenn Behälter teilweise mit ultraviolettabsorbierendem farblosen Glas überdeckt wird). Effekt besonders deutlich bei Ameisen. Diese tragen ihre Puppen in einen ultraviolettarmen Raum, selbst wenn dieser unserm Auge etwa 200 mal heller erleuchtet erscheint als ein danebenbefindlicher, an ultravioletten Strahlen reicher Raum. Aehnliche Befunde bei Bienen. Die Vernachlässigung dieser grossen Empfindlichkeit für Ultraviolett kann ein Farbenunterscheidungsvermögen vortäuschen wo es nicht vorhanden ist.

Bethe (Frankfurt a/M.)

32. Nicolai, F., Experimentelle Untersuchungen über das Haften von Gesichtseindrücken und dessen zeitlichen Verlauf. *Arch. f. d. ges. Psychol.*, 1921, **42**, 132–149.

Es handelt sich um Versuche an Volksschulkindern und Erwachsenen ungebildeter Stände. Kleinere Gegenstände wurden in Gruppen von 10, 20 und mehr einmal geboten und dann während einer Woche mehrere Reproduktionen von den Versuchspersonen verlangt. Ergebnis: Die Eindrücke haften nach anfänglichem stärkeren Vergessen sehr zäh im Gedächtnis. Die wiederholten Reproduktionen wirken auch ungewollt befestigend auf die Vorstellungen: besonders wichtig ist dabei die Reproduktion unmittelbar nach der Darbietung. Gesteigerte Anforderungen bewirken auch gesteigerte Leistungen, die jedoch einem Maximum zustreben und nicht den Anforderungen proportional verlaufen. Eine zunehmende Fülle von Gegenständen in Einzelgruppen dargeboten wirkt verwirrend nur auf die Lokalisation, nicht auf die Zahl der Gegenstände.

F. Nicolai (Altenbusek)

33. Lehmann, T., Zur Psychologie des Verleichs kurzer Zeiten. *Arch. f. d. ges. Psychol.*, 1921, **41**, 277–309.

Vergleichswersuche mit leeren Zeitintervallen von 40–200 σ bestätigen die Beobachtungen von Katz, dass in zahlreichen Vergleichsfällen das Urteil lediglich auf Grund der Wahrnehmung des veränderlichen Vergleichsintervalls abgegeben wird. Durch wie-

derholte Barbietung etwa der Intervalle 70, 80, 90, 100, 110, 120, 130 σ wird offenbar sehr bald eine sensorische Einstellung auf ein Intervall von etwa 100 σ hervorgerufen. Ist letzteres das Hauptintervall, so erübright sich seine weitere Vorführung. Nunmehr isoliert dargebotene Vergleichsintervalle werden mit unverminderter Genauigkeit als grösser resp. kleiner unterschieden, indem ihnen zugleich der Charakter absolut grosser bezw. kleiner Intervalle zugeschrieben wird. Die hier wirksame Intervalleinstellung erweist sich von grosser Dauerhaftigkeit. Nach 3tägiger Pause war sie in unverminderter Schärfe nachweisbar. Sie zeigt weitgehende Analogie mit der motorischen Einstellung. Ueberraschend war, dass selbst Intervalle von weniger als 200 σ das Erlebnis von letzter Dauer hervorrufen können.

T. Lehmann (Leipzig)

34. Kirschmann, A., Der Metallglanz und die Farbe der Metalle. *Arch. f. d. ges. Psychol.*, 1921, 41, 90–116.

Aller echter Glanz ist parallaktisch. Die meisten Arten des Glanzes beruhen auf der binokularen Parallaxe und erscheinen daher auch in der stereoskopischen Photographie. Der Metallglanz tut dies nicht. Trotzdem muss er parallaktischer Natur sein, wie schon *Phil. Stud.*, XI, S. 147 ff. gezeigt wurde, wo er unter Ausschluss aller anderen Möglichkeiten auf die Parallaxe des indirekten Sehens zurückgeführt wurde. Das Licht, das von einem Punkte einer metallglänzenden Fläche ausgehen scheint, muss aus Komponenten von erheblicher Wegdifferenz bestehen. Die Metalle sind aus durchsichtigen Körperchen von sehr hohem Brechungsindex zu sammengesetzt. Hieraus erklärt sich u.a., dass es keine ausgesprochen blauen und grünen Metalle gibt., und dass die gelben und roten in Legierungen so geringe färbende Kraft besitzen.—Man kann den Metallglanz mit Hülfe ganz unmetallischer durchsichtiger Mittel hervorbringen. Solche "Pseudometalle" können im psychologischen Institut in Leipzig jederzeit in Augenschein genommen werden.

A. Kirschmann (Leipzig)

35. Müller, A., Beiträge zum Problem der Referenzflächen des Himmels und der Gestirne. *Arch. f. d. ges. Psychol.*, 1921, 41, 47–89.

Der Aufsatz untersucht die seit dem Buche des Verf. "Die Referenzflächen des H. u. d. Gest." (Braunschweig 1918) er-

schienenen Arbeiten über die Sehform des Himmelsgewölbes und die Änderung der Sehgrössen der Gestirne mit der Höhe. Es wird gezeigt dass die Sehgrösse messbar ist, aber nur durch Sehgrössen. Die Erklärung der Form des Himmels durch eine optisch-atmosphärische Grenzschicht wird in einem besonderen Falle aus physikalischen und im allgemeinen aus psychologischen Gründen zurückgewiesen. Die Wirkung des trüben Mediums auf den psychologischen Einfluss der roten Strahlen zurückzuführen, ist innerhalb gewisser Grenzen vielleicht richtig. Eine Geometrie des Sehraumes wird geprüft und ergibt sich erfahrungsgemäss als unbegründet und gegenstandstheoretisch als Geometrie eines Schätzungsraumes.

A. Müller (Bonn)

36. Herrmann, F., Der Einfluss des Kontrastes auf den Successivvergleich innerhalb eines festen Reizsystems bei Augenmassversuchen. *Arch. f. d. ges. Psychol.*, 1921, **41**, 1–46.

Vergleichsobjekte: Kurzdauernd exponierte Strecken von 76 bis 234 mm; "Vollständige Reihen" nach der Konstanzmethode. Sämtliche Einzelversuche der Reihen für 10 bis 14 Hauptreize (H), die sich um je 6 mm (nur bei Gruppe III um 12 mm) von einander unterschieden, wurden in einer einzigen Gruppe völlig zufällig untermischt. I. Gruppe: H 106 bis 190, aber bei 106 H zuerst, bei 112 V (Vergleichsreiz), bei 118 H u.s.w. Die heirbie unwissentlich bleibende Zeitlage von H übt keinen merklichen Einflus auf den Schätzungsfehler aus. Daher blieb sie bei II und III konstant H zuerst. II. Gr. H 76 bis 124, III. Gr. H 126 bis 234. Resultat: Regelmässige Unterschätzung des vorangehenden Reizes bei den unteren Stufen der Gruppe, Überschätzung bei den oberen. Offenbarer Einflus eines absoluten Kontrasteindruckes. Überwiegen der Überschätzungstendenz. Schätzungsfehler bis zu ca 7% des Hauptreizes.

W. Wirth (Leipzig)

37. Tittel, M., Ueber Angleichung und Kontrast im Tongebiet. *Arch. f. d. ges. Psychol.*, 1921, **41**, 353–381.

Durch Stimmgabeln wurden Töne von 120–1100 Schwingungen erzeugt. Zu jeder Versuchsreihe gehörten 3 Gabeln: Zuerst wurde der induzierende Ton gegeben, unmittelbar darauf der Normalton und nach 2 Sekunden Pause der Vergleichston. Angleichung an den induzierenden Ton fand statt, wenn die Entfernung zwischen

ihm und dem Normalton kleiner, Kontrastwirkung zeigte sich, wenn sie grösser war als eine Oktave. Maxima der Angleichung traten ein, wenn der induzierende Ton Sekunde und Terz des Normaltons, Minima, wenn er Quarte oder Quinte war. Die letzten beiden Intervalle wurden wohl ihrer häufigen Verwendung in der Musik wegen als besonders scharf umschrieben aufgefasst. Diese analysierende Einstellung wirkt der Induktion entgegen. Die absolute Grösse der Induktionswirkungen wächst mit zunehmender Schwingungszahl der Normaltöne.

M. Tittel (Leipzig)

38. Tschermak, A. v., Der exakte Subjektivismus in der neueren Sinnesphysiologie. *Arch. f. d. ges. Physiol.*, 1921, **188**, 1–20.

Die naive Ansicht, dass wir die Welt so wahrnehmen, wie sie an sich ist, wurde durch Joh. Müllers Gesetz der spezifischen Sinnesenergien berichtigt. Da dieses eigentlich eine "Selbstanschauung der Netzhaut" bedeutet, war die Theorie der Lokalzeichen von Lotze ein Fortschritt für die Möglichkeit der Zuordnung von subjektiven Eindrücken. Dieser wurde von Hering und Tschermak ("Ordnungswerte" und "Grössenwerte" des optischen Raumsinnes) weitergeführt. In einzelnen wird gezeigt, dass unser Bewusstsein sich nicht auf objektive Lichtwellen, Schallwellen usf. abstimmt, sondern nur auf Subjektives (Sehraum usf.).

H. Henning (Frankfurt a/M.)

39. Plassmann, J., Die Milchstrasse als Gegenstand der Sinneswahrnehmung. *Zeits. f. Psychol.*, 1921, **88**, 120–129.

Qualitative und quantitative Analyse des Eindruckes, welchen uns die Milchstrasse am Himmel vermittelt, und astronomische Begründung der Einzeltatsachen.

H. Henning (Frankfurt a/M.)

4. FEELING AND EMOTION

40. Perrin, F. A. C., Physical Attractiveness and Repulsiveness. *J. of Exper. Psychol.*, 1921, **4**, 203–217.

A statistical study of the reports of college students regarding those traits in individuals which make for attractiveness and repulsiveness reveals the fact that physical characteristics, especially sexual, play a decisive rôle. Static traits, such as beauty or ugli-

ness of features, hold a position subordinate to groups of physical elements like expressive behavior, affectionate disposition, grace of manner, aristocratic bearing, social accomplishments, personal habits, *etc.* That is to say, physical attractiveness is to be explained primarily in terms of behavior. The traditional antithesis between beauty and brains seems to be without support. Similarly, those individuals with religious, social, and æsthetic ideals are usually endowed with attractive physical traits: the possession of the latter facilitates the acquisition of the former.

C. C. Pratt (Clark)

41. Dana, C. L., The Anatomic Seat of the Emotions: A Discussion of the James-Lange Theory. *Arch. of Neurol. and Psychiat.*, 1921, **6**, 634–639.

In criticism of the James Lange theory of the emotions, Dana presents a group of clinical facts to show that "the somatic and skeletal muscles and sympathetic system proper have at least nothing but a minor and contributing effect in arousing conscious emotional states." He cites the case of a woman who suffered no change emotionally even though, as a result of breaking her neck at the third and fourth cervical level, her skeletal system was practically eliminated and the sympathetic entirely so. Patients suffering from terminal stages of tabes, family periodic paralysis, progressive muscular atrophy with complete bodily immobility and paralysis, show emotional reactions normal to their condition even though muscular movements are practically eliminated except those moving automatically under the vegetative nervous system. Furthermore, the fact that with emotion, bodily sensations are felt, does not prove that they come from the periphery. Such bodily sensations may be central and thalamic in origin. Again in lesions of the brain stem and thalamus, expressions of the emotions in the form of tears and laughter may occur automatically without any real emotion of sorrow or joy. In view of such clinical data, Dana offers the theory that "emotion is centrally located and results from the action and interaction of the cortex and thalamus. He feels the James Lange theory to be true only in part; that is, "the peripheral visceral stimuli are only later and contributing factors to emotion," and "the skeletal muscles and sympathetic system do not play an essential part."

G. L. Lowden (Boston Psychopathic Hospital)

42. GROSSART, F., Das tachistoskopische Verlesen unter besonderer Berücksichtigung des Einflusses von Gefühlen und der Frage des objektiven und subjektiven Typus. *Arch. f. d. ges. Psychol.*, 1921, 41, 121–200.

Bei Darbietungen gefühlsbetonter, indifferenter und sinnloser Worte im Wundtschen Tachistoskope in Abständen von 10 cm zwischen 1, 50–0, 30 m erwies sich nach Ausschaltung der andern einwirkenden Faktoren—wichtigster die Geläufigkeit—eine grosse Assimilationskraft des Gefühls, die häufig illusionäre Wirlungen hatte, indem sowohl bei Lust wie Unlustfärbung Verlesungen in Richtung optisch ähnlicher gefühlsbetonter Worte stattfanden. Dagegen wurde von solchen unlustbetonten Komplexworten, welche das Wesen der Persönlichkeit selbst, ihr innewohende Unwerte berührten, weggelesen. Dieser auffallende Unterschied bedingt die Annahme verschiedener Unlustqualitäten, blosse Intensitätsverschiedenheiten erklären ihn nicht. Der schon früher gefundene Gegensatz zwischen objektivem und subjektivem Typus wurde dahin klargestellt, dass jener passiv-beschreibend dieser aktiv-gestaltend vorgeht, Aufmerksamkeitsumfang, Emotionalitätsstärke und Selbstkritik ihn dagegen nicht bestimmen.

F. GROSSART (Bonn)

5. MOTOR PHENOMENA AND ACTION

43. AYRES, C. E., Instinct and Capacity, I: The Instinct of Belief-in-Instincts. *J. of Philos.*, 1921, 18, 561–566.

Since Alfred Russell Wallace's review of Lloyd Morgan's book on *Habit and Instinct* in 1897, in which he said that this subject of instincts had been neglected, psychological literature has "rained" instincts. The concept of instinct has served a good purpose. It has helped the social psychologist to explain social behavior, but he has neglected to note the special instinct-reflexes which control hands and throat. Each instinct must be characterized as a sort of "urge," but in man they cannot be called stereotyped patterns of reaction as in the case of animals. The notion of instincts as having "ends" is absolutely arbitrary. But some constant dynamic tendency must be assumed that will "tie up" to the "primary" activities. "The social scientist has no need of instincts, he has institutions."

T. R. GARTH (Texas)

44. Ayres, C. E., Instinct and Capacity, II: Homo Domesticus. *J. of Philos.*, 1921, **18**, 600–606.

"Civilizations stand at the cross-roads and scrutinize each other, and ask: 'How do they do it?'" But man is extremely adaptable and that is the answer to the question. He has always been easily domesticated. His behavior is so easily modified. When it comes to two races their intolerance for each other's traditions accounts for their very permanency. Civilization may not be a "conspiracy" against intelligence, it is merely a mode of behavior. Lower animals are "structure-bound and instinct-bound" but man is "culture-bound." Differences in race between men are largely differences in culture and not differences in instinct. All are easily "domesticated."

T. R. Garth (Texas)

45. Kuo, Z. Y., Giving Up Instincts in Psychology. *J. of Philos.*, 1921, **18**, 645–664.

The theory of instincts is as old as the study of psychology itself, but it is only recently that the instincts have been applied to all fields of psychology. In fact they have become a current fad in psychology. All sorts of things are attributed to instincts, *i.e.*, labor troubles, war, social unrest, and the Freudians make the sex instinct the most fundamental thing in human nature. No two psychologists agree as to a definition of instincts. There are two classes of definition. First are those which regard instincts as innate tendencies to act and second those who think of them as combinations of reflexes which are inherited. It is regarded as adaptive or teleological and again it is regarded as stereotyped. The methods used in the study of instincts are: the genetic, the experimental, and the observational.

The fact is there are no instincts, for writers cannot agree on a classification, and again they are in the last analysis "acquired trends" due to impressions brought to bear on the subject, and furthermore methods of investigation are so unreliable that the results of such findings are untrustworthy. Psychology has been biased by the Darwinian theory of natural selection and calling every spontaneous reaction by some biological term. Students of instinct are in error in regarding an instinct as an impulse furnishing a drive. Woodworth points out that actions of adults, especially, "are more and more controlled by inner drives." However, these inner drives are not "mystical forces" but have their

origin in the outside. As a reinterpretation of the facts: spontaneous acts are all that we can credit man with in the beginning; the newborn babe's acts are non-adaptive; but out of these spontaneous acts, or reaction units, coördinated acts of the organism are integrated; these coördinations have a number of characteristics; and a number of elementary units remain unintegrated throughout life. Watson having failed to find any appearance of specified instincts in the newborn babe is forced to accept the serial order of their arrival, but this has no scientific proof. We believe that the random acts in the young child are responsible in the first place for his later learning.

T. R. GARTH (Texas)

46. GIVLER, R. C., The Intellectual Significance of the Grasping Reflex. *J. of Philos.*, 1921, **18**, 617–629.

It has been charged against the behaviorist that he has given too simple an explanation to the complex mental processes. In fact the most complicated states may be due to ever so slight causes, as for instance an irritable disposition due to a carious tooth, etc. The introspectionist expects the behaviorist to make use of introspections as the chief data of psychology when he himself does not make use of the chosen data of his science completely. Moreover, the anti-behaviorist has taken an unchivalrous attitude toward physiology. They have regarded the human body as an architectural structure rather than a going machine. The terminus of psychology has been for the last thirty years reflex response. The law of dynamogenesis pointed in that direction. The grasping reflex is important because it is an index of normality, it is true, but its chief significance is meaning for the learning process. Three factors contribute toward the tenacity of this reflex. The first is that flexion is more powerful than extension. Another factor of importance is that the proprioceptive system is stimulated by the flexion-reflex of grasping which reinforces the contraction. Even this is learned and suggests that no act is really instinctive. However, this reflex has probably functioned before birth. The use of the flexed hand in educating us indicates something of its importance to learning. The grasping reflex has been sufficiently recognized in our language, *i.e.*, "Grabbing," "snatching," "acquisition," "Grasping at Straws." Going further, "management, government, tyranny, are basically the grasping reflex." Because we do not with what we think is no proof that we think with the

brain. To think of doing something differs from the actual act in the matter of nerve and muscle fibres involved. The all-or-none law functions here.

T. R. Garth (Texas)

47. Moede, W., Einzel- und Gruppenarbeit. *Praktische Psychol.*, 1920–21, **2**, 71–81; 108–115.

Wirft die Frage auf, ob sich an der Hand von planmässigen Versuchen betriebswichtige Erfahrungen über die Bedingungen der Zusammenarbeit von Menschen gewinnen lassen. Die Versuche wurden in Klassengemeinschaften angestellt. Der Effekt gleichartiger Arbeit in Einzel- resp. Gruppentätigkeit werden miteinander verglichen und zwar Schnelligkeits- und Kraftleistungen, sowie einfache geistige Arbeit. Das Zusammenarbeiten in der Gruppe erhöht im allgemeinen den Leistungseffekt unter Angleichung der einzelnen Arbeitskräfte aneinander. Der Arbeitseffekt der besseren Arbeiter sinkt etwa um die Hälfte der Leistungssteigerung der schlechteren. Desgleichen steigert der Wetteifer das Gruppenquantum, jedoch nur, wenn die Leistungsmöglichkeiten der Kämpfenden nicht zu grosse Unterschiede aufweisen. Zum Schluss wird die Bedeutung der Ergebnisse fur den industriellen Arbeitsverlauf ausgeführt.

H. Bogen (Berlin)

48. Weber, E., Fortschritte der Ermüdungsmessung. *Praktische Psychol.*, 1921, **2**, 97–108.

Der Verfasser ist der Entdecker einer neuen Methode der Ermüdungsmessung bei reiner Muskelarbeit. Bei jedem Gesunden tritt nach einer bestimmten Menge von Muskelarbeit eine Umkehrung der Blutverschiebung ein. Im Zustand der Ermüdung verengert sich das gesamte Gefässsystem des Muskelarbeiters. Der Eintritt dieses Zeitpunktes mit seiner schädigenden Wirkung auf die Arbeitskraft des Einzelnen und auf die Gesamtleistung des Betriebes wird mit Hilfe des Plethysmographen an der Blutdruckfülle des Armes festgestellt. Die Versuchsperson hat dabei mit dem Fuss eine genau zu kontrollierende Bewegung auszuführen.

H. Bogen (Berlin)

49. Tramm, K. A., Arbeitswissenschaftliche Untersuchung der menschlichen Geräte und Arbeitsverfahren. *Praktische Psychol.*, 1921, 2, 179–186; 210–219.

Die Ergebnisse der Anatomie, Physiologie und Psychologie sind auf die arbeitswissenschaftlichen Forschungen, welche die Anpassung des Menschen an die Arbeit zum Ziel haben, anzuwenden.

H. Bogen (Berlin)

50. Burnham, Wm. H., The Significance of the Conditioned Reflex in Mental Hygiene. *Ment. Hyg.*, 1921, 5, 673–706.

This article reviews many of the important facts concerning the experimental history of the conditioned reflex, the phenomenon of inhibition and its relation to the conditioned reflex, the conditioned reflex in child behavior, the conditioned reflex and psychoanalysis and the importance of the conditioned reflex in explaining such phenomena as have frequently been attributed to supernatural causes,—alleged phenomena of spiritism, witchcraft and the like. The subject matter here represented in condensed form covers so wide a field that a brief review will not give the reader an idea of its content. Numerous illustrations and quotations from the literature, together with a summary of thirty paragraphs and a bibliography of forty-one titles, contribute so much to the worth of the article that it should be of general interest and value.

R. H. Wheeler (Oregon)

6. ATTENTION, MEMORY AND THOUGHT

51. Piorkowski, C., Gedächtnis schulung auf natürlicher Grundlage. *Praktische Psychol.*, 1921, 2, 169–179; 193–210.

Das in Berlin bestehende (private) Institut für praktische Psychologie hat Methoden ausgebildet, mit deren Hilfe normale und pathologische Gedächtnisstörungen zu beseitigen versucht werden. Geschult werden die Komponenten der Fähigkeit zum Einprägen: Beobachtungsfähigkeit und Konzentration, es wird zur richtigen Benutzung des individuellen Vorstellungs-und Denktypus und zur Gewöhnung an das Herstellen sinnvoller Beziehungen und des Herausfindens des Wesentlichen erzogen. Die Funktionsschulung wird an für diese Zwecke modifizierten Versuchsanordnungen aus der exakten Psychologie vorgenommen.

H. Bogen (Berlin)

52. Rudlowski, R., Kasuisticher Beitrag zur Psychologie der Aussage. *Arch. f. d. ges. Psychol.*, 1921, 41, 270–276.

In der Vorlesung wurde ein Unfall durch Hochspannungsleitung imitiert. Der Procentsatz der Falschaussagen, die man zu beeidigen bereit wäre, war höher als bei früheren Bildversuchen (22%), mit Zunahme dieser "Affektstörungen" beim weiblichen Geschlecht.

W. Wirth (Leipzig)

53. Moers, M., Untersuchung über das unmittelbare Behalten bei verschiedenen Darbietungsarten und über das dabei auftretende totale und diskrete Verhalten der Aufmerksamkeit. *Arch. f. d. ges. Psychol.*, 1921, 41, 205–269.

Die Gedächtnisversuche (mit Buchstaben und sinnlosen Silben) ergaben, dass eine Darbietung, bei der aufeinanderfolgende Silben räumlich nebeneinander erschienen, ebenso günstig war wie die akustische Darbietung und viel günstiger (Fehlerabnahme von 22%) als eine optische Darbietung, bei der das Material an derselben Stelle erschien (Lipmannscher Gedächtnis-apparat): Augenbewegungen wurden einfacher, die Lokalisation erleichtert.

Ferner rechtfertigte die Untersuchung eine Gegenüberstellung totaler und diskreter Aufmerksamkeit. Der totale Aufmerksamkeitstyp (Akustiker und sprachmotorische Akustiker) erfasst die Silbenreihe als eine Einheit, auf die sich die Energie während der Auffassung verteilt und die auch in der Pause im Bewusstsein bleibt. Der diskrete Aufmerksamkeitstyp (Visuelle und Motorisch-Impulsive) erfasst jedes Element mit maximaler Aufmerksamkeitskonzentration; es tritt aber sofort zurück und taucht erst bei der Reproduktion wieder auf.

M. Moers (Bonn)

54. Bouman, L., und Grünbaum, A. A., Kausuistischer Beitrag zur Vorstellungspsychologie. *Zeits. f. Psychol.*, 1920, 85, 297–306.

Ein Patient mit lebhaften Tagträumen, die ihm geben, was der Alltag ihm versagt, erlebt auch im Assoziationsversuch lebhafte Vorstellungen, sobald eine egozentrische Reaktionsform vorhanden ist, andernfalls zeigt sein Vorstellungsvermögen eine grosse Armut. Möglicherweise spielen solche Dispositionen auch sonst in der Psychologie eine Rolle.

H. Henning (Frankfurt a/M.)

55. Keller, H., Eine Verbesserung am Hippschen Chronoskop. *Zeits. f. Psychol.*, 1920, **85**, 309.

Drehbare Zelluloidkapseln mit Ziffereinteilung, durch welche die Uhrzeiger hindurchschimmern, werden auf das Chronoskop aufgesetzt, sodass die Zeit nicht durch ein Rechenexempel festgestellt zu werden braucht, sondern nach der Drehung des Nullstriches auf den Zeiger direkt abgelesen werden kann.

H. Henning (Frankfurt a/M.)

56. Plassmann, J., Säkulare Veränderlichkeit des Dezimalfehlers II. *Zeits. f. Psychol.*, 1920, **85**, 307–308.

Der Schätzungsfehler eines Astronomen beim Ablesen wird in seiner Veränderlichkeit durch mehrere Jahre hindurch zahlenmässig bestimmt.

H. Henning (Frankfurt a/M.)

57. Hermann, I., Ueber formale Wahltendenzen. *Zeits. f. Psychol.*, 1921, **87**, 345–363.

Die von Marbe aufgestellte Gleichförmigkeit wird mit Wählen beliebiger Ziffern und mit der Wahl eines räumlichen Gliedes nachgeprüft. Hierbei zeigt sich eine Randglied-Wahltendenz und eine Mittelglied-Wahltendenz. Die erstere ist primitiver. Die Befunde werden mit der Aesthetik von Lipps und mit der Tierpsychologie in Berührung gebracht.

H. Henning (Frankfurt a/M.)

58. Keller, H. H., Experimentelle Beiträge zur Lehre vom Wiedererkennen. *Zeits. f. Psychol.*, 1921, **87**, 315–344.

Der Unterschied im Wiedererkennen sinnloser und sinnvoller Worte wird untersucht. Zunächst zeigte sich ein Vorteil der sinnlosen Worte (auf Grund erhöhter Aufmerksamkeitskonzentration), nach 24 Stunden kehrte sich das Verhältnis um. Vorbekannte Silben sind hinsichtlich des Wiederkennens immer überlegen. Im einzelnen werden genaue Analogien zum 1. und 2. Jostwchen Satze gefunden.

H. Henning (Frankfurt a/M.)

59. Hegge, T. G., Gedächtniskünstler und ihre Lernmethoden. *Praktische Psychol.*, 1921, **3**, 33–44.

H. vergleicht das aus genauen Untersuchungen bekannte Zustandekommen der Gedächtnisleistungen Dr. Rückle's und des

Frl.-Bergh. Beiden ist die innere visuelle Rekonstruktion des Stoffes, die Lokalisation in einem inneren räumlichen Bild, Komplex- und Gruppenbildung und die Bildung von Hilfsvorstellungen gemeinsam. Während bei Rückle alle diese Hilfen auf vorwiegend logisch-abstraktem Wegeaus seiner hervorragenden mathematischen Begabungung zu erklären ist, ist Bergh bei der Komplexbildung anschaulichphantasiemässig kombinierend tätig. Sie schafft aus den Ziffern Figuren, die innerhalb genau bestimmter Räume bestimmte Situationen eingehen, in denen sie psychologisch motivierte Handlungen vollziehen (Pragmatische Ketten). In andern Fällen verbindet sie die Ziffern zu bildhaften Komplexen. Gewöhnung anderer Personen an diese Lernmethode führte zu gesteigerte Gedächtnisleistungen.

BOGEN (Berlin)

7. SOCIAL FUNCTIONS OF THE INDIVIDUAL

60. SPAETH, R. A., Length of Work-Day and Industrial Health. *Nation's Health*, 1922, 4, 32–33.

No precise rule of universal application has been formulated to determine the nervous fatigue of the workman, nor does the degree of fatigue usually denote a given amount of work done. Intense effort can provoke fatigue before any considerable amount of work is done. Prolonged hours of labor may merely distribute a fixed amount of energy over a longer period, or increasing inertia from prolonged effort overcome apparent advantage in the longer day. To attain the maximum yield from labor is to proportion the elements of work to the physiological requirements of the workman. The speed of economical work is determined by precise and specific studies in each industry or, it may be, in each shop.

M. E. GALLAGHER (Pennsylvania)

61. LELAND, B., A Case of Special Difficulty with Reading. *Psychol. Clinic*, 1922, 13, 238–244.

Dana's struggles with reading, the elusiveness of words, the perverseness of language, are here described.

M. E. GALLAGHER (Pennsylvania)

62. BLANTON, S., Speech Defects in School Children. *Ment. Hyg.*, 1921, 5, 820–827.

Investigations show that about 2.7 per cent. of school children have some sort of speech disorder; 0.7 to 0.9 per cent. stutter.

Certain of these defects may be traced to lack of mental development, others to faulty training, others to lack of motor coördination of the tongue, palate, lips, throat and jaw. Lack of motor coördination is usually symptomatic. The teacher doing speech-corrective work should have a knowledge of physiology, speech, drill, behavioristic psychology and the psychology of the emotions.

R. H. Wheeler (Oregon)

63. Schilling, A., Beiträge zur Psychotechnik der Schreibmaschine und ihrer Bedienung II. Rationalisierung der Maschinenkonstruktion auf psychotechnischer Grundlage. *Praktische Psychol.*, 1921, 3, 21–31.

Grundlage bildet ein 2½ stündiges Dauerschreiben gleichmässig beschulter Anwärterinnen, dem eine Ermüdungsuntersuchung parallel ging. Das Blindschreibe strengt die Handmuskulatur mehr an als das Tippen. Beide Schreibweisen erforde den gleichen Grad der Aufmerksamkeit. Die köperliche und geistig Ermüdung ist beim Sehendschreiber grösser als beim Blindschreiber, der auch die grössere Schreibleistung aufweist. Die Tastatur hat sich also dem Blindschreiber anzupassen. Aus den Versuchen ergibt sich, dass die Tastatur eine Unterreihe haben muss, die höher liegt und näher an die Mittelreihe herangerückt ist. Vorteilhaft würde auch eine Neigung der Knöpfe nach der Innenseite sein.

Bogen (Berlin)

64. Fischer, A., Sprachpsychologische Untersuchungsmethoden im Dienst von Erziehung und Unterricht. *Zeits. f. päd. Psychol.*, 1921, 22, 103–117.

Die Bearbeitung des Wortschatzes der individuellen Sprache erstreckt sich auf die Feststellung der Bekanntheit eines Wortes und seiner Bedeutungsanalyse. Im frühen Kindesalter dienen zur Aufnahme des Wortschatzes: Aufzeichnung jedes erstmalig gebrauchten Wortes, gelgentliche Feststellung des Redeinhalts eines Tages, des Wortbesitzes für ein bestimmtes Sachgebiet. Das Ergebnis der Bedeutungsanalyse muss zu der Sprache des Erwachsenen in Vergleich gestellt werden. Bei der Materialverarbeitung ist der Altersfortschritt und der Einfluss der sozialen Umwelt auf Umfang und Inhalt des Sprachschatzes zu berücksichtigen. Im Schulalter ist durch Verwendung von Reizworten der Sprachbesitz einzelner Sachgebiete festzustellen. Mit dem Vorangehenden ist

die Vorarbeit für die Untersuchung der Entwicklung der individuellen Grammatik geleistet. Dieser Forschung dienen Satzantworten, -ergänzungen und -umformungen in erster Linie.

BOGEN (Berlin)

8. SPECIAL MENTAL CONDITIONS

65. DAVIS, T. L., The Sanity of Hamlet. *J. of Philos.*, 1921, **18**, 629–634.

Hamlet evidently developed a psychosis as a result of his grief for his father coupled with his mother's unseemly conduct. He shuts himself out from his friends after the interview with the ghost of his father. However, Hamlet is aware of his own mental processes and criticizes his own thoughts. It has been suggested by Sir Francis Galton that great men may be "indebted to touches of madness" for their great thoughts. We do not know whether or not Hamlet was mad—when maddest he seemed sanest. He appears to have had a great fondness for logic and used more of it when he was most crazy.

T. R. GARTH (Texas)

66. MILLS, C. K., Some Theoretical and some Practical Aspects of Psychanalysis. *Arch. of Neurol. and Psychiat.*, 1921, **6**, 595–609.

The writer affirms that psychanalysis is a form of mysticism or semimysticism, and finds proof of this in the comments of psycho-analysts regarding one another. He emphasizes the undue use of terminology; the various interpretations of the unconscious; the improper methods of using dream analysis; and the unjustifiable use of sexual symbolisms in dream and direct analysis. He remarks, briefly, that the literature of psychoanalysis has focused attention on the important rôle of sexual factors in the psychoneuroses, but concludes that it has a grave deteriorating effect upon the moral fiber of society. He points out the failure of psychoanalysis in the treatment of war neuroses, and believes that it will rapidly lose ground and go down to the dust to be forgotten. The value of the paper is questionable: it is ridicule. One feels that in presenting this satire the writer had a very good time.

R. S. HUNT (Harvard)

67. Prince, M., A Critique of Psychanalysis. *Arch. of Neurol. and Psychiat.*, 1921, **6**, 610–633.

Psychanalysis as a method of probing the mind by the technique of free associations is valuable, but has its errors and limitations. The errors are due: to the necessity of postulating questionable mental mechanisms; to the dependence on interpretations; and to the fact that interpretations are so varied, many antecedent experiences can be found as possible causal factors of a given phenomenon. Freud's invaluable contributions are the theories of repression and conflict. Most of the other doctrines of psychanalysis are unsubstantiated, and irreconcilable with the facts gained by other methods of research. The concept of the unconscious is unsound and too narrow. The Freudian theory of the motive forces determining behavior disregards the work done by such men as McDougall. The theories of psychanalysis are more metaphysical than scientific.

R. S. Hunt (Harvard)

9. NERVOUS AND MENTAL DISORDERS

68. Coroleu, W. C., Legislative Restrictions in Connection with the Treatment of Incipient Insanity. *J. Ment. Sci.*, 1921, **67**, 470–474.

"Popular prejudice has caused to be embodied in all the laws procedures which operate against the early treatment of insanity. The fear of illegal sequestration, kept alive by novels, plays and cinematographs, is as much a nightmare as the possibility of premature burial."

Legislation practically everywhere, says the author, is more liberal than in his own country, Spain. Certification and admission to asylums is attended by a great many formalities. The vast collection of obsolete legislation is very disadvantageous to the early treatment of the insane. Legislative restrictions in Spain seriously hamper the practice of psychological medicine which, even under most favorable circumstances, is a difficult matter. The author urges that clinical institutions for the insane should be opened for patients as are those devoted to all other branches of medicine and surgery.

R. E. Leaming (Pennsylvania)

69. AUDEN, G. A., The School Medical Service in Relation to Mental Defect. *J. Ment. Sci.*, 1921, **67**, 475–482.

This paper takes up the presentation of the case of the school medical officer in relation to a unification of those medical services which deal with the various aspects of mental defect. The school medical officer holds a vital position because the solution of the problem of mental deficiency, from the point of view of the community, depends upon early diagnosis and the school officer has a wonderful opportunity for that. Mental deficiency has been viewed from many standpoints through the ages—the theurgic (considering it a visitation of Divine Providence and so to be accepted), the compassionate, the educational, the sociological and most recent of all the eugenic. The ultimate criterion is social efficiency not educational aptitude. The only sound approach to the subject must be a teleological one.

On the educational side the two-factor theory of intellectual capacity is now generally accepted. It consists of two variables—first, general intelligence (the result of the functioning of the brain as a whole, innate and subject to the laws of heredity), and second, the specific educational capacities for reading, the formation of number concepts, etc., which depend on the functioning of certain focal areas of the brain. A sound training in educational psychology is therefore necessary for the examining medical officer if he would avoid pitfalls.

The author states that one of the most urgent needs of the present day in England is the establishment of psycho-educational clinics for the examination of all children presenting abnormalities of educational progress or conduct. School medical officers should be urged to take the Diploma in Psychological Medicine which could be extended to meet their needs and which should include more of the sociological science than hitherto.

R. E. LEAMING (Pennsylvania)

70. HILDEBRANDT, K., Forensische Begutachtung eines Spartakisten. *Z. f. Psychiat. u. psychisch-gerichtliche Med.*, 1920–21, **76**, 479–518.

Der ausführlich mitgeteilte Fall betrifft einen Spartakisten mit hysterischer psychopathischer Konstitution und ist auch für die Normalpsychologie beachtenswert.

TH. ZIEHEN (Halle a.S.)

71. v. Muralt, A., Analyse eines Grippedelirs. *All. Z. f. Psychiat. u. psychisch-gerichtliche Med.*, 1920–21, **76**, 519–562.

Grippedelirien von fünftägiger Dauer werden im Sinn der Freudschen Theorie analysiert und gedeutet. Die erhebliche Aehnlichkeit mit einem normalen Traum wird stark betont.

Th. Ziehen (Halle a.S.)

72. Bleuler, E., Ueber psychische Gelegenheitsapparate und Abreagieren. *All. Z. f. Psychiat. u. psychisch-gerichtliche Med.*, 1920–21, **76**, 669–698.

Verf. meint die Annahme, dass die Energiequanten, die ein einmal gesetzter Affekt enthält, notwendig durch eine Reaktion abgeführt werden müssten (Abreagieren), als unrichtig erweisen zu können. Das Gehirn hat in sich viel zu viel Möglichkeiten der Erzeugung und Umwandlung von Energie, als dass ein solcher Entladungsvorgang nötig wäre. Verdrängte Komplexe entladen sich oft Jahrzehnte lang in psychischen Reaktionen (ev. krankhaften Symptomen) und erschöpfen sich trotzdem nicht. Was die Therapie mit Abreagieren erreicht, kann auch auf anderen Wegen, wenn auch nicht immer ebenso leicht, erreicht werden. Andrerseits gehen viele schwere Affektstürme auch ohne Abreagieren vorüber. Die seither als Abreagieren aufgefassten Erfahrungen will Bl. daher folgendermassen deuten. Bei Gelegenheit des Bedürfnisses irgendeiner Handlung wird für diese bstimmte "Gelegenheit" durch einen blossen einmaligen Entschluss ein zerebraler Apparat zusammengestellt, der im Prinzip der gleiche ist wie die phylogenetisch zusammengestellten Reflexapparate (vgl. "Einstellung" bei den psychologischen Reaktionsversuchen). Dieser Apparat nun muss, wenn er nicht immer wieder funktionieren soll, abgestellt werden. Meist demontiert er sich selbst dadurch, dass die Handlung ausgeführt ist, oder er wird durch einen Gegenbefehl abgestellt, oder durch widerstrebende Funktionen gehemmt. Viele Gelegenheitsapparate aber, die zwar einem wichtigen Trieb dienen, aber kräftigen Tendenzen des bewussten Ich widerstreben, werden bloss v e r d r ä n g t. Missglückt die Verdrängung, kommt sie nicht einer Abstellung gleich, so schafft der Apparat vom Unbewussten aus allerlei neurotische und psychotische Symptome. Da er verdrängt, d. h. vom Bewusstsein abgespalten ist, kann er direkt von diesem aus nicht mehr aufgehoben werden. Bei den Erfahrungen über angebliches Abreagieren handelt es sich nach Bl. nicht um Abführung aufgespeicherter Energie, sonderm um "Abstellung" eines

hypothetischen Apparatus. Die Wirkung der Psychoanalyse beruht darauf, dass ein solches mit dem bewussten Ich assoziativ verbunden wird; dadurch wird er der Anstellung zugänglich und kann wirkungslos gemacht werden.

TH. ZIEHEN (Halle a.S.)

73. REINHOLD, J., Polyglotte Halluzinationen. *Monatss. f. Psychiat. u. Neurol.*, 1921, **50**, 65–98.

Auf Grund von Beobachtungen über polyglotte Halluzinationen scheint dem Verf. "die rein psychische Genese" der Sprachhalluzinationen restlos bewiesen und damit im Weg der Analogie auch für andere Halluzinationsformen wahrscheinlich.

TH. ZIEHEN (Halle a.S.)

74. PICK, A., Neues zur Psychologie der Konfabulation. *Monatss. f. Psychiat. u. Neurol.*, 1921, **49**, 313–322.

Kurze Bemerkungen zur Psychologie der Konfabulation. Verf. hebt namentlich die N ö t i g u n g zur Ausfüllung der Erinnerungslücke im Sinn eines T o t a l eindrucks hervor.

TH. ZIEHEN (Halle a.S.)

75. KRAMBACH, R., Dauersymptome und amyostatische Krankheitszustände nach Enzephalitis. *Monatss. f. Psychiat. u. Neurol.*, 1921, **50**, 189–201.

Fall mutmasslicher Enzephalitis lethargica nach Grippe mit Schlafsucht und amyostatischen Störungen, auf psychischem Gebiet eigentümlicher Mangel an Initiative, dessen sich Patient durchaus bewusst ist, und der objektiv als Verarmung der Spontanbewegungen imponiert; wenn eine besondere Anspannung des Willens zur Ausführung einer Bewegung erfolgt, so erfolgt die Bewegung, ganz im Gegensatz zu den sonst trägen aktiven Bewegungen, prompt (psychologischer Untersuchungsbefund sehr dürftig).

TH. ZIEHEN (Halle a.S.)

76. v. PODMANICZKY, T., Stirnhirn und Körpergleichgewicht. Klinische Beobachtungen bei Stirnhirnverletzten. *Deutsche Z. f. Nervenheilkunde*, 1921, **67**, 41–54.

Aus 12 Fällen reiner Stirnhirnverletzungen schliesst Verf., dass dem Stirnhirn eine gewisse Rolle bei dem "ustandekommen des Körpergleichgewichts zukommt. Es steht dabei in steter Kooperation mit dem Kleinhirn. Zentrifugale Bahn des "Stato-

tonus," soweit er vom Stirnhirn abhängig ist: Frontalrinde—Sehhügel—Nucleus ruber—Tractus rubrospinalis—Peripherie.

TH. ZIEHEN (Halle a.S.)

77. DONATH, J., Ideeller Masochismus im zarten Kindesalter. *Deutsche Z. f. Nervenheilkunde*, 1921, **68–69**, 257–264.

Fall eines Knaben, bei dem die ersten masochistischen Vorstellungen bald nach dem 4. Lebensjahr im Anschluss an masturbatorische Manipulationen einer Dienstmagd an seinen Genitalien auftauchen.

TH. ZIEHEN (Halle a.S.)

78. ANONYMOUS, Mental Hygiene and the College Student—Twenty Years After. *Ment. Hyg.*, 1921, **5**, 736–740.

The author recalls that forty per cent. of his classmates with whom he was more or less acquainted (representing about seventy-five per cent. of the entire class) suffered from various sorts and degrees of mental disorders. Nine cases of "scratch diagnoses" are described. These considerations, although rough and inadequate, point to the desirability of a mental hygiene for college students.

R. H. WHEELER (Oregon)

79. FULLER, E. W., Extra-institutional Care of Mental Defectives. *Ment. Hyg.*, 1921, **5**, 828–835.

This is a further vindication of the clinic in the care of mental defectives.

R. H. WHEELER (Oregon)

80. POLLOCK, H. M., Eugenics as a Factor in the Prevention of Mental Disease. *Ment. Hyg.*, 1921, **5**, 807–812.

R. H. WHEELER (Oregon)

81. JACOBY, A. L., Mental Hygiene Problems of Maladjusted Children as Seen in a Public Clinic. *Ment. Hyg.*, 1921, **5**, 813–819.

R. H. WHEELER (Oregon)

82. ADLER, H. M., The Function of the Correctional Institution. *Ment. Hyg.*, 1921, **5**, 778–783.

R. H. WHEELER (Oregon)

83. JOHNSON, A. E., What is a "Nervous Breakdown"? *Ment. Hyg.*, 1921, 5, 784–790.

R. H. WHEELER (Oregon)

84. DOLL, E. A., The Classification of Defective Delinquents. *J. of Crim. Law and Crim.*, 1921, 12, 360–368.

The New Jersey State Hospital was asked to develop a scientific classification of defective delinquents. The classification formulated, together with suggestions as to proper institutional care, are discussed. Six classes are recognized. First are feeble-minded stable occasional delinquents. Feeble-mindedness is here primary, defective temperament or environment secondary. Training schools are recommended for trainable members of this class, colonies for industrial adults and custodial institutions for the low grade. Second are feeble-minded, unstable occasional delinquents. Instability is here predominant, low mentality secondary, temperament or environment tertiary. State hospital care is recommended until instability is cured and then an institution for feeble-minded. Third are feeble-minded stable habitual delinquents. Delinquency is predominant, temperament or environment being primary, feeble-mindedness secondary. Correctional institutions are recommended under special segregation until reformed and then an institution for feeble-minded. State hospitals are recommended for the following three classes, in which instability predominates, until cured of instability, and then correctional institutions for reclassification: first, for feeble-minded unstable habitual delinquents, in whose case defective temperament and environment are primary factors; second, for non-feeble-minded unstable occasional delinquents; third, for non-feeble-minded unstable habitual delinquents. Five types of instability are recognized, for four of which medical treatment is possible: the toxemic, congenitally syphilitic, epileptoid, endocrinopathic and environmental.

R. W. WASHBURN (Boston Psychopathic Hospital)

85. ZIEGLER, L. H., A Study of "X": Psychometric and Otherwise. *Amer. J. of Psychiat.*, 1921, 1, 199–210.

"X" is a man 32 years old, of a family with no discoverable psychotic or neurotic determinants. He has shown increasing occupational nomadism and made a decidedly poor army adjustment. When urged by his family to assume social relations with

girls, delusions of persecution appeared. He has been in many hospitals on charges of homosexual misconduct or because of persecutory delusions. Whether his sex instinct was congenitally defective or suffered an early traumatism is difficult to say. In three different intelligence tests he made a satisfactory rating, though deficient in detecting absurdities and in designing geometrical figures. Uhrbrock's Moral Judgment Test, which promises to be particularly valuable for psychiatrists, was badly done. His general score was above the median in Downey's Will-Temperament Test but he revealed lack of motor inhibition, care for details and his aggressive make-up. In Pressey's X-O Test of Emotional Reactions, he marked more fear, more self-feeling and more paranoid words than the average. In general, he gave a definitely paranoid reaction and disclosed other emotional defects. The history and the tests, especially those for traits other than general intelligence, support and supplement each other.

A. F. Buck (Boston Psychopathic Hospital)

86. Bowers, E. B., The Dangerous Insane. *J. of Crim. Law and Crim.*, 1921, 12, 369–380.

Bowers defines the dangerous insane as comprised of the "insane criminal" who have become insane or whose insanity has been discovered after committal to prison and of the "criminal insane" whom the court has found to be insane at the time when the criminal act was committed or at the trial. Next, he considers the nature of the offenses committed (chiefly crimes against the person) and the characteristics peculiar to this class of offenders from which considerations he adduces conclusive evidence of the necessity of special institutions. He then describes in outline the architecture of the Indiana State Hospital, the management, the state laws pertinent and the effect on the behavior of the inmates of the affiliated State Prison. He concludes by rehearsing the benefits and necessity of such institutions or equivalent provision, which benefits in brief are the protection of society, the protection of other prisoners, the prevention of unwarranted punishment and insurance of suitable care for irresponsible persons, the behavior improvement and the reduction of malingering among inmates of affiliated institutions, and the decrease of pseudo-insanity court cases.

O. Grosklaus (Radcliffe)

87. Spaulding, E. R., Emotional Episodes among Psychopathic Delinquent Women. *J. of Nerv. and Ment. Dis.*, 1921, 54, 298–323.

The purpose of this paper is to show the sources of emotion expressed in the outbursts that were common among patients at the Bedford Reformatory. Much knowledge of the emotional life may be obtained from such episodes, and they may be considered of value as indicators of the keynote of the individual's social maladjustment. In order to illustrate this, six delinquent women, who were subject to episodal attacks, are described in detail. "The types represented by the six patients might be designated in Freudian terminology briefly as archaic, masochistic, narcissistic, infantile and sadistic, and having attributes of Jehovah." Three distinct sources of the emotional outbursts are derived: First: "that of thwarted desire in not being able to always have their own way and dominate every person with whom they came in contact and each situation that arose." Second: "the interference with some secondary or adaptive mechanism such as screaming, lying, fighting, stealing or running away." Third: "the disclosure, or at least unconscious tapping of initial inferiorities, inadequacies, complexes or failures in development, such as unwillingness or inability to grow up and assume adult responsibilities, detach interest from individual egotism and project it beyond that narrow circle, make necessary adaptations and perhaps accept a place as one in a group without necessarily being its leader."

J. P. Currie (Boston Psychopathic Hospital)

88. Anonymous, Epidemic (Lethargic) Encephalitis. A personal experience. *J. Amer. Med. Ass.*, 1922, 78, 407–409.

This is an introspective and self-observational report of a case of sleeping sickness. The writer describes nervous and mental symptoms extending over two months before the acute stage. He was exceedingly nervous, slept irregularly and his mind was quite overactive. At times "my mind raced with thoughts coming and being carried to their conclusion with such speed that the experience was extremely pleasant. These thoughts have stayed with me almost as clearly as though they were last night." Speech as well as thought was abnormally rapid. The three weeks acute stage was spent in a hospital. He was irrational much of the time, and remembers little that occurred.

Following that came a six months convalescence during the first month of which "my memory was an almost absolute blank, and

my past was so hazy that it was impossible for me even to understand why I was living with my family." After the first month, in spite of the most strenuous efforts, I frequently went to sleep. Sleep overwhelmed me during the short street car rides to and from the office. At home it was impossible for me to sit at the table until the meal was finished. I must lie down. At night I could not overcome a fear of I knew not what. I made endless rounds to see that the windows and doors were locked. The nights were terrors for me and I was glad when daylight returned." Convalescence consisted of the gradual subsidence of these symptoms. About nine months after the first nervousness was recognized, and seven months after the beginning of the acute illness, his recovery was practically complete. None of the symptoms of irritability, rapid talking and flightiness, often persisting long after the acute stage of this disease, appeared in this case.

R. H. Sylvester (Drake)

10. INDIVIDUAL, RACIAL AND SOCIAL PSYCHOLOGY

89. Starr, A. S., A Day in Court—Problems in Correctional Guidance. *Psychol. Clinic*, 1922, **13**, 256–264.

How a socialized court, dedicated to the ideal that no person should be necessarily handicapped, and that each citizen should give out the best that is in him, works for the fuller realization of its ideal is described by the Psychologist for the Juvenile Division of the Municipal Court of Philadelphia.

M. E. Gallagher (Pennsylvania)

90. Kenworthy, M. E., Extra-medical Services in the Management of Misconduct in Problems in Children. *Ment. Hyg.*, 1921, **5**, 724–735.

This is a discussion of the motives of misconduct, especially those traceable to family relations such as an antagonistic attitude on the part of the father, extreme dependence of the child upon the parent, attitude of elder children toward their younger brothers and sisters, the attitude of the mother toward the youngest child (attempt to retain the "baby"), the attempt of the youngest to emulate standards set by older children in the family when mental or physical handicaps prevent such an achievement. There is also discussed the problem of removing the child from his home environ-

ment if the latter is responsible for maladjustment. First, the home situation should be adjusted if possible through education of the parents and child; second, keeping the child at home has the advantage of assisting him to form the habit of facing trying situations; third, removing the child has the disadvantage possibly found in a subsequent return to life on a lower economic scale where a second readjustment is necessary.

R. H. WHEELER (Oregon)

91. STEARNS, A. W., Suicide in Massachusetts. *Ment. Hyg.*, 1921, 5, 752–777.

This is a suggestive statistical and qualitative treatment of the problem. One third of the 167 cases studied were definitely insane, while most of the others showed some limitation of responsibility. Since 1841 the suicide rate in Massachusetts has steadily increased. Tables are presented which show that the divorce rate has increased from 26 to 60 per 100,000 since 1870, that suicide is associated only roughly with unemployment, that there are almost four times as many male suicides as female, that for the most part suicides are confined to the relatively poorly educated as far as schooling goes, that the majority of suicides are comfortably situated, economically, that about one half of the suicides are married, that suicides increase with advancing age and that the early spring and summer months show the highest rates. Suicide, he believes, is an expression of a negative self-feeling and so can be caused by any unpleasant experience. The causes of suicide are psychological rather than economic.

R. H. WHEELER (Oregon)

92. CLARK, M. V., Mental Hygiene and the Public Library. *Ment. Hyg.*, 1921, 5, 791–793.

This brief paper shows the need for a more scientific classification of reading matter pertaining to Mental Hygiene and for published statements of authoritative and useful books and articles on specialized topics in this field.

R. H. WHEELER (Oregon)

93. HALE, D. O., Inadequate Social Examinations in Psychopathic Clinics. *Ment. Hyg.*, 1921, 5, 794–806.

As the title suggests, much of the therapeutic work done in clinics underreaches its aim unless social problems are taken into account. Thus the need of a social worker in connection with a clinic is evident.

R. H. WHEELER (Oregon)

94. KLOPP, H. I., How a State Hospital Coöperated with a University to Meet a Community Need. *Amer. J. of Psychiat.*, 1921, 1, 159–166.

A State Hospital has two functions, first as a hospital for mental diseases, second as a part of the general scheme of community service. The Allentown State Hospital's first activity as a community center from the clinical standpoint was its connection with a medical school as a teaching hospital. Second, it held clinics for doctors. Third, it established mental clinics in adjacent cities. Fourth, it became associated as a teaching clinic with Lehigh University. This broadened into a connection with the University Extension Summer School course for teachers, the Biology Department of Muhlenberg College, and the Allentown High School Civics classes. It is in the schools that the state can do the most effective work for the promotion of mental health. In 1919 the Pennsylvania Legislature passed an act pertaining to backward children, which has increased the demand for trained teachers for the special classes. Therefore, in the summer of 1920 Lehigh University offered courses in mental hygiene to teachers. As a part of this course they went to the Hospital where they attended lectures and clinics. In the Department of Psychology the students were given courses in mental diagnosis and the giving of psychometric tests, so the University became a center for the teaching of mental hygiene.

I. M. MACLEISH (Boston Psychopathic Hospital)

95. HOAG, E. B., and WILLIAMS, E. H., The Case of J. P. Watson, the Modern Bluebeard. *J. of Crim. Law and Crim.*, 1921, 12, 348–359.

In this article is described in a somewhat popular fashion the case of a most unusual type of criminal. Watson, a man of considerable refinement, culture and unquestioned intelligence, confessed to having, within a period of three years, contracted twenty-one or more illegal marriages and murdered at least nine of these wives. Details of these acts were given absolutely without emotional accompaniment and in an impersonal, coolly-exact manner. Paradoxically, he was quite affected lest his real identity come out, and those, who in his earlier days without parents or support had befriended him, learn thereof. No remorse was felt for the acts themselves, however, which he claimed were committed under the influence of a dominating impulse which allowed him no rest until they were accomplished. In youth and previous to this period,

he had always been of a normal, kind and considerate type, experiencing none of the tendencies of the usual moral imbecile towards cruelty to children or animals. He now considers this obsession for killing women as a temporary illness from which he is already recovering fast and of which he will soon be completely rid. Diagnosis, admittedly inadequate and controversial, was: congenital psychic inferiority, with sex perversion, to which is possibly added an epileptic type of personality. "Such cases as these demand the fullest and most complete investigation possible and that the penitentiary authorities should leave no opportunity untouched which might shed light on such tremendously important social, medical and psychological problems."

J. P. Currie (Boston Psychopathic Hospital)

11. MENTAL DEVELOPMENT IN MAN

96. Pressey, S. L., Empiricism versus Formalism in Work with Mental Tests. *J. of Philos.*, 1921, **18**, 393–398.

In reply to a criticism made by Ruml the writer of this article states that the issues may be put briefly, being, (1) He contends for a method more empirical in using tests and a more careful use of hypotheses. Theory with reference to normal distribution curve is too much in evidence in obtaining measures so that the validity of the results seems difficult of determination. A formal statistical method has arisen. Under the circumstances it is safer to return to a thoroughly empirical method. (2) Testing is now a technical science. But the writer would be willing to sacrifice or wave considerations of technique and statistics for practical values as for instance the welfare of some child. But practice of a contrary sort is just now common. (3) All hypotheses not yet verified thoroughly must be eliminated from methods to be used. Empirical methods will bring the experimenter closer to an analysis of practical problems.

T. R. Garth (Texas)

97. Kelley, T. L., and Terman, L. J., Dr. Ruml's Criticism of Mental Test Methods. *J. of Philos.*, 1921, **18**, 459–465.

No one has assumed linearity of general intelligence in the sense in which Dr. Ruml appears to use the term. Various sorts of tests should be used in measuring different sorts of mental process, but we may combine those tests if the combination affords more interpretation of the facts than the single test. It is something like

appraising a mineral deposit, *i.e.*, securing samples from various parts of the deposit. The Binet scale is for finding out the various levels of "diverse intelligences." Dr. Ruml criticizes the assumption of "rectilinear regressions between intelligence and test performance," but anything else than a fair rectilinear regression in such tests is seldom found. Little error has accrued from assuming rectilinearity, though there are exceptions in trade test findings. The ultimate value of an hypothesis does not depend upon its correctness necessarily, but probably upon its fruitfulness. Dr. Ruml does not believe that the intelligence is static but does not support his statement sufficiently. However, much good will come of such criticisms. The young science is probably girding itself for a new advance.

T. R. Garth (Texas)

98. Dillingham, A., Superior Children—Their School Progress. *J. of Educ. Psychol.*, 1920, 11, 327–347.

The author makes a critical examination of the course usually prescribed for children of high I.Q. Since getting educated means covering certain ground, the child with the high I.Q. should cover the ground at a more rapid rate. "Probably the most unusual method of attaining this short cut is to test the child 'scientifically' and place him in a class with children whose average mental age corresponds with his. Of course, this arrangement quite ignores character and emotional differences due to physical maturity or the lack of it. Intellect is regarded as the determining factor and no difficulty is anticipated from placing the clever baby of ten with an I.Q. of 150 in a class with average 15-year-old adolescent pupils." The wisdom of this procedure is tested by the statistical study of intelligence and school progress of 174 children. Eighteen case histories are given to illustrate the frequent discrepancies between expected and actual accomplishment and the problems which these children of high I.Q. present to the teacher. The conclusion is that character, emotional and physical traits are to be given equal weight with I.Q. in determining the rate of school progress.

A. T. Poffenberger (Columbia)

99. Stone, C. W., and Colvin, C., How to Study as a Source of Motive in Educational Psychology. *J. of Educ. Psychol.*, 1920, 11, 348–354.

This paper affords an interesting illustration of the influence of a motive and of the practice method in increasing efficiency in college

classes. Interest in "How to Study" increased rate of reading and degree of comprehension 180 per cent. as shown by comparison with a control group of students. Other factors in the study process showed quite large improvements. It is equally as startling to discover on how low a plane of ability college students work as to discover how much improvement can be made through the devices described in the paper. Any motive, however extraneous, would seem justified by these results.

A. T. Poffenberger (Columbia)

100. Pressey, S. L., Two Important Points with Regard to Age-Grade Tables. *J. of Educ. Psychol.*, 1920, 11, 355–360.

The two points in regard to age-grade tables discussed at some length are: (1) For many practical situations, the best single statement of the age-grade situation is in terms not of per cent. of retardation, but of median age per grade. This is both more convenient and more sound than the more customary method. (2) Differences in age-grade distribution, from school to school and from school system to school system, must always be taken into account in using tests. This can best be done in terms of median age per grade.

A. T. Poffenberger (Columbia)

101. Bridges, J. W., The Correlation between College Grades and the Army Alpha Intelligence Tests. *J. of Educ. Psychol.*, 1920, 11, 361–367.

In this report are presented distribution tables for Alpha score and scholarship, Alpha score and academic grade, also for Alpha score and grade in Agriculture, Arts, Engineering and Education separately. The cases were obtained for study by making a random selection from 5,950 test records made at the Ohio State University. One of the most striking things about the data is the large number of students with high Alpha scores and poor academic records. The coefficient of correlation for the largest group studied is plus .35. This is lower than the figures obtained by other investigators. It is, of course, an indication of the importance of the socalled character qualities in academic success. Considerable differences in size of the coefficients for the different schools (Agriculture, etc.) suggest to the author the need for specialized tests for students of the different colleges rather than that Alpha has a selective value in this respect.

A. T. Poffenberger (Columbia)

102. RUCH, G. M., and STRACHAN, L., Intelligence Ratings by Group Scales and by Stanford Revision of the Binet Tests. *J. of Educ. Psychol.*, 1920, 11, 421–429.

The Army Alpha is compared with the Chicago scale of Freeman and Rugg by checking each against the Terman Revision of the Binet tests as a criterion. One hundred and sixteen cases were measured by the three tests. The coefficient of correlation for the Army Alpha was plus .73 and for Chicago scale plus .62. The coefficients for the separate tests appearing in both scales were higher for the Army Alpha than for the Chicago scale except in one case where they were about equal. Two reasons are given for the lower figures obtained from the Chicago scale, namely that it is a shorter test, requiring about half the time of Army Alpha; and the failure on the part of many high-grade students to comprehend the instructions of the Chicago scale. In one part of the test there were twenty per cent. of zero scores. Other less significant differences between the two group tests are pointed out by the authors.

A. T. POFFENBERGER (Columbia)

103. SACKETT, L. W., Tests for Mental Alertness. *J. of Educ. Psychol.*, 1920, 11, 430–444.

The tests were intended "to determine to what degree retardation in elementary schools is caused by, or at least accompanied by, mental inertia, or slowness in regard to simple tasks." The tests consist of a short story to be read and recalled immediately afterward, and a set of 15 exercises based on the story. These exercises are somewhat like a "following directions" test. The records of nearly 6,000 children in the 4th, 5th, 6th and 7th grades are presented in tables. The tests requiring only a few minutes are said to reveal the ability of the several members of a class to do general school work almost as accurately as the teacher by general observation can do after many months of intimate acquaintance. Further, the importance of mental sluggishness is such as to deserve more attention than it has received in the search for causes of school retardation. Analysis of the data shows other interesting facts about the tests.

A. T. POFFENBERGER (Columbia)

104. VAN WAGENEN, M. J., and KELLEY, F. E., Language Abilities and their Relations to College Marks. *J. of Educ. Psychol.*, 1920, 11, 459–473.

"The present study is an attempt to determine the inter-relations of the abilities involved in theme writing, in reading for understanding of content, and in completing mutilated sentences, and the relations of each of these abilities or groups of abilities to marks received in a college course in rhetoric and to marks received in whatever academic courses had been taken by these students in the sophomore year of their college course." Four sets of records were correlated with all the school marks for first and second semester: (1) Two written themes scored by the Thorndike Extension of the Hillegas Composition Scale. (2) Two readings tests constructed like the Thorndike, Understanding of Sentences Tests. (3) Two forms of the Trabue Language Completion Test. (4) Rhetoric marks for the first and second semester of the sophomore year.

The coefficients of correlation are all very low. Among the reasons given for the low coefficients are: (1) The ninety-eight subjects form a highly selected group. (2) The tests were not entirely satisfactory, as indicated by the rise in coefficients when the two types of each test were combined. (3) The school marks were probably too much influenced by other than ability factors, such as personal appearance, pleasant voice, good manners, etc. Intercorrelations among the various records show their relative independence. For example, reading ability and composition ability are correlated plus .52. Many other interesting relations may be gleaned from the extensive correlation tables.

A. T. POFFENBERGER (Columbia)

105. LEAMING, R. E., Five Cases of Vocational Guidance. *Psychol. Clinic*, 1922, 13, 245–255.

How she guided five different types of "job-seekers"—the beautiful but wild nocturnal wanderer, Josephine—the cherubic Frank whose love of crap kept him from holding a job—Mary Pearl who would take nothing other than some nice, easy work which would not be hard on her—Jake who would take a job, borrow ten cents from his employer, and leave, not to return—and Katherine upon whom everybody had a "pick"—are vividly told by a Counselor.

M. E. GALLAGHER (Pennsylvania)

106. MANN, C., Failures Due to Language Deficiency. *Psychol. Clinic*, 1922, 13, 230–237.

Children in two different kindergartens in Philadelphia were given psychological tests to determine their fitness for first-grade work. Results of these tests revealed a decided discrepancy in the language ability of the children of the two kindergartens. In one, the children entered a supposedly standardized first grade knowing little or no English; in the other, they had all the knowledge of the language that is to be expected at their age.

M. E. GALLAGHER (Pennsylvania)

107. POOLE, G., Four Cases of Diagnostic Teaching. *Psychol. Clinic*, 1922, 13, 225–237.

In 1919, because Dr. Lightner Witmer of the University of Pennsylvania considered Diagnostic Teaching one of the most important methods of the Clinical examination, a special staff officer called the "Clinic Teacher" was appointed in the Psychological Clinic of the University. The teaching of the Clinic Teacher follows the analytic diagnosis and is based on the child's known assets and defects of mentality. The best methods for coping with individual educational problems are here employed. The four cases of Diagnostic Teaching, as described by Gladys Poole, a Clinic Teacher, show what results were obtained by a careful study of the cases of Teddy, James, Raymond and Harvey.

M. E. GALLAGHER (Pennsylvania)

108. IDE, G. G., Diagnostic Problems in Educational Guidance at the Observation School, University of Pennsylvania, Summer of 1920. *Psychol. Clinic*, 1922, 13, 265–273.

Dr. Gladys G. Ide discusses the problems of the Observation School at the University of Pennsylvania, during the summer of 1920. These same problems, from a slightly different angle, are present in practically every school.

M. E. GALLAGHER (Pennsylvania)

109. IDE, G. G., A Clinical Survey of a First Grade. *Psychol. Clinic*, 1922, 13, 274–287.

The psychologist is interested in: What a child is like who enters the first grade. What does he bring to school? What does he lack for efficient work? With what children should he be associated? Is there a danger to him in his associates? What can be

done with the group as it appears the first morning of school? Of what value will it be if an attempt is made to sort the children? Will it be of economic value, aside from the education of a good social product, that is, will it pay the community in terms of dollars and cents? To contribute toward the ultimate solution of this problem, Dr. Ide and two assistants tested school children of a first grade. Dr. Ide discusses this survey under the headings: The Local Problem, The School Organization, The Method of Testing, The Tests, The Group, Physical Defects, Educational Tests, The Performance Tests, The Binet Tests, The Colored School and Results.

M. E. Gallagher (Pennsylvania)

110. Dunston, J. T., The Problem of the Feeble-minded in South Africa. *J. Ment. Sci.*, 1921, **67**, 449–459.

The policy of the Government in South Africa has been to bring all persons, whether suffering from defect or disorder of the mind, under one control—at the present time that of the Minister of the Interior. The Commissioner of Mental Disorders, under the Act of 1916, has been made responsible for keeping a register of all mentally disordered and defective persons, and for seeing that they are under proper guardianship or care. Physician-superintendents and medical staffs of the various mental hospitals have had the opportunity of going outside their institutions, and making investigations in the various prisons, reformatories, industrial schools and the community generally in their immediate neighborhood.

The inmates of institutions mentioned above are classified as follows: (*a*) normal, (*b*) backward and borderline, (*c*) feeble-minded, (*d*) moral imbecile and feeble-minded with unpleasant traits of character or conduct, and (*e*) idiots and imbeciles. Classes (*d*) and (*e*) are certified and sent to government institutions or placed under suitable care elsewhere as soon as the diagnosis is made. The classes (*b*) and (*c*) are dealt with in a special part of the institution provided for them and kept there until they are either returned to normal classes or certified and removed.

In regard to the native population the author quotes several excellent reasons why it may be inferred that the natives are mentally an inferior race. He advises against hasty judgments, however, and points out the fact that careful psychological investigations should be carried on to determine this question definitely.

The coarser forms of mental defect, idiocy and the lower grades of imbecility do not appear to be so common as they are amongst the white population. This may be due in part to the former tribal customs of destroying the defectives and furthermore to the fact that until the advent of the white man tuberculosis, syphilis and chronic alcoholism were not known amongst them.

R. E. LEAMING (Pennsylvania)

111. COLIN, H., Mental Hygiene and Prophylaxis in France. *J. Ment. Sci.*, 1921, **67**, 459–470.

In 1914 a revision of the French law of 1838 regarding the insane was proposed. The law of 1838 read, "Each department is to have a public establishment designed specially to admit and care for the insane." The proposed revision read, "Persons suffering from mental affections which compromise public order or who are dangerous to themselves or others are to be cared for and detained in special establishments when they cannot be provided for at their own homes." An intention was thus expressed of bringing the asylums into line with the hospitals.

The war broke out before the new law was passed. On December 8, 1920, *La Ligue d'Hygiene mentale* was formed with the aim of divulging "the principles of mental hygiene and prophylaxis and to favor their application by constant pressure on the constituted powers and on public opinion," in other words, to continue the work started by the proposed revision.

The author states that insanity is, in a great number of cases, curable and avoidable. "The technique of mental prophylaxis consists in the first place of discovering, by the clinic and laboratory, the subjects who present a particular mental weakness, in order to place them under hygienic conditions unfavorable for the eventual outbreak of mental disorders."

The treatment of the psychopathic is at the present time imperfect. It concerns itself only with conditions of confirmed insanity. The irksome and vexatious formalities of certification keep the milder cases away from the asylums. For mild psychoses and for acute mental disorders there ought to be reserved another method of treatment which permits the creation of uncertified wards and dispensaries. The organization of uncertified wards in the asylums will be the most efficacious method of combating the prejudice which attaches itself to asylums and to the insane. *La Ligue d'Hygiene mentale* has been formed with one of its principal aims the establishment of such clinics, dispensaries and wards.

The author states that he does not favor the blending of psychiatry and neurology because, while they are two parallel divisions of the pathology of one and the same system, the disorders and the methods of observation and treatment are not the same.

R. E. LEAMING (Pennsylvania)

112. STENQUIST, J. L., An Improved Form for Rating by the Order of Merit Method. *J. of Educ. Psychol.*, 1920, **11**, 526–528.

Stenquist has constructed a blank form for the convenient handling of order of merit studies. The blank is divided vertically by perforations, and the right half of the blank is further divided horizontally into a number of slips by perforations. The sheet is folded vertically, a carbon inserted and the names copied on the left half of the blank. On the right half of the blank each slip will then contain one of the names. These slips may be easily taken apart and arranged in any desired order, and the final order indicated in the proper place on the left half of the blank. The labor of making numerous arrangements is greatly reduced, greater accuracy obtained, and a wider spread of ranks is obtained than is obtainable with only a list.

A. T. POFFENBERGER (Columbia)

113. GREENE, H. A., Tests for the Measurement of Certain Phases of Linguistic Organization in Sentences. *J. of Educ. Psychol.*, 1920, **11**, 517–525.

Language ability is analyzed into about twenty elements, one of these being the ability to organize material into sentences. For this element the author devises a test or measuring scale. It is of the disarranged sentence type. There are two forms of the test, equivalent in difficulty, each form consisting of ten sentences, forming a scale of difficulty from easy to hard. The material has been standardized through tests of 1,634 children in school grades 3 to 8. The statistical procedure in constructing the scales was the same as that used in making the Trabue Completion Test scales. Standards are furnished in the form of normal score per school grade.

The author notes the tendency toward the construction of tests for very specialized functions and believes that progress of the greatest value lies along this line.

A. T. POFFENBERGER (Columbia)

114. WHEELER, T., A Study of Certain Recreational, Reading and Vocational Phases in the Lives of Young Girls. *J. of Educ. Psychol.*, 1920, 11, 481–501.

Interviews or conversations with 800 girls ranging in age from 6 to 20 years form the material for this study. The data were gathered into the recreational, reading and vocational interests. The children were classed into 5 groups as follows: 6 to 10 years; 11 to 12 years; 13 to 14 years; 15 to 16 years; and 17 to 20 years. The three types of interests were considered separately for each age group. Aside from the general classifications of interests, certain special matters were considered and suggested important problems for the educator. Among these is the very limited range of vocations that seem to be known to the girls, even those of the oldest group. A large proportion of the vocations suggested was covered by the three, teaching, stenography and nursing. Then, there are the consequences of parental opposition to the vocations which the girls choose for themselves, and the possible evil consequences of the discord thus arising. There are the tendencies to group reaction which begin to crop out in the older groups, which may work for good or ill according to the direction that the tendencies receive.

A list of the books that are liked by the different groups is given at the end of the article, with a suggestion of the range of ages covered by certain of the books.

A. T. POFFENBERGER (Columbia)

115. GILLILAND, A. R., The Effect of Rate of Silent Reading on Ability to Recall. *J. of Educ. Psychol.*, 1920, 11, 474–479.

The author makes a somewhat different attack upon the question of the relation between rate of reading and the degree of comprehension from that commonly used. Instead of determining the comprehension of slow and fast readers, he finds the relation between degree of comprehension and rate of reading when the rate is arbitrarily changed. Subjects were tested with three reading speeds, one that is normal for the individual, one that is fast for him and another that is slow for him. There was no exact determination of these speeds. The total comprehension score seems not to change with change in speed, but the number of ideas gained per second does increase when the speed is increased. It would seem advisable, therefore, to stress speed of silent reading in the teaching process not only to increase speed in the preparation of lessons but also to "greatly increase their efficiency in life."

A. T. POFFENBERGER (Columbia)

116. PLAUT, P., Gründschliches sur Reklamepsychologie. *Z. f. angew. Psychol.*, 1921, 18, 225–249.

Die Reklamepsychologie als Wissenschaft sucht die psychologische Oekonomisierung der Reklame, ihre Wirksamkeit zu erfassen, aber nicht minder zu zeigen, wo sie zum Unfug wird. Es gilt, mit dem nichtssagenden Begriff der Massensuggestion. aufzuräumen. Wir unterscheiden hinsichtlich der Einstellung eine objektive un eine materiale Disposition. Bei der ersten ist Wille und Gefühlsrichtung auf ein bestimmtes Objekt gerichtet; hier wird eine Werbewirksamkeit von neuer oder entgegengesetzter Richtung ausgeschlossen, die Eingangsdisposition durchgeführt. Bei der materialen hingegen entscheidet die Gefühlslage, der materiale Gehalt wirbt hier, er bildet erst einen Kaufwunsch oder ändert einen, der bereits unbestimmt vorlag, im Sinne des letzt-flüchtigen Blickes um.

P. PLAUT (Berlin)

117. MÜLLER, H., Ueber sprachliche Begabung und ihre Prüfung bei 13jährigen Volksschülern. *Praktische Psychol.*, 1920, 2, 3–10.

Bei der psychologischen Ausleseprüfung besonders befähigter Kinder für höhere Schulen in Berlin werden neuerdings neben der Prüfungsserie zur Feststellung der Höhenlage der schulwichtigen Funktionen Testserien zur Erkennung der besonderen sprachlichen Anlage verwendet. Die Untersuchung der sprachlichen Begabung erstreckt sich auf 1. Merkfähigkeit für fremde Wortbilder, 2. rubrizierendes Denken, 3. Ausdrucks- und 4. Urteilsfähigkeit. Zu 1 werden Formen des Singulars und Plurals der ersten und zweiten lateinischen Deklination, deren Wortbilder nur geringe Unterschiede zeigen, eingeprägt und reproduziert. Zu 2 sollen verschiedene Genetive logisch gesondert werden. Zu 3: Drei Sätze sollen in unbeschränkter Zahl umgeformt werden. Zu 4: Es werden geprüft kausale Analyse, Definieren, Finden des Wesentlichen und Unterscheidung verwandter Begriffe.

H. BOGEN (Berlin)

118. AMMON, K., Die Nummern in Fernsprechverkehr. *Praktische Psychol.*, 1920, 2, 10–13.

Um das häufige Vergreifen der Telefonistinnen beim Verbinden auf ein Mindestmass herabzusetzen, wird eine Anordnung der Klinken vorgeschlagen, die einen höheren Aufmerksamkeitswert

in sich schliesst und eine schnellere und sicherere Einübung im Abgreifen der Klinkenentfernungen gewährleistet.

H. Bogen (Berlin)

119. Olivier, Zur Psychologie der Schaltarbeit im Fernsprechbetriebe. *Praktische Psychol.*, 1920, **2**, 13–18.

Eine Analyse der Schaltarbeit ergibt, dass die Fehlerursachen in bestimmten Seh- und Gedächtnisfehlern liegen. Zur Behebung der Fehler wurden Aufmerksamkeitswerte für bestimmte Klinken geschaffen. Dann wurde bei der Anlernung der Telefonistinnen besonderer Wert auf die Übung des Raumgedächtnisses gelegt. Fehlerzahl und Überlastung gingen nach Einführung des Neuen auf ein Minimum zurück.

H. Bogen (Berlin)

120. Lewy, H., Die experimentelle Psychologie im Dienst der Arzneimitteluntersuchung. *Praktische Psychol.*, 1920, **2**, 18–21.

Der Wirksamkeitsgrad dreier Chinin-Präparate ist mit Hilfe psychologischer Methoden festgestellt worden. Es war das prophylaktisch wirksamste, die Dienstfrische des Soldaten am wenigsten herabsetzende Präparat zu bestimmen.

H. Bogen (Berlin)

121. Schlichting, P., Die Auswahl von Mechanikerlehrlingen bei der Firma Morell, Leipzig. *Praktische Psychol.*, 1920, **2**, 21–26.

Die Auslese betrifft Mechaniker-, Werkzeugschlosser- und Zeichnerlehrlinge. An berufswichtigen Eigenschaften werden geprüft: Gedankenausdruck, Gedächtnis für Aufträge, fur Zahlen und Formen, fur Raumlage, Konzentration, Raumvorstellung und technisches Verständnis; Augenmass, Tastgefühl, Gelenkempfindlichkeit, Schärfe der Beobachtung und Geschicklichkeit. Für alle drei Berufe wurde die gleich Testserie verwendet, wobei den geprüften Eigenschaften den Berufen entsprechend verschiedene "Gewichte" zuerteilt wurden.

H. Bogen (Berlin)

122. Schulte, R. W., Beiträge zur Reklamepsychologie: Buchstabenzwischenraum und Lesbarkeit. *Praktische Psychol.*, 1920, **2**, 28–30.

Das Optimum der Lesbarkeit ist mit 1 : 0, 5 für das Verhältnis der Buchstabenbreite zum Zwischenraum ermittelt.

H. Bogen (Berlin)

123. Moll, A., Krankhafte Störungen im Seelenleben des Jugendlichen. *Praktische Psychol.*, 1920, **2**, 33–40.

Kurze Darstellung der Beziehungen zwischen Zeit derb Pubertätsentwicklung und der Auslösung von Perversionen, Neurosen und Psychopathien.

H. Bogen (Berlin)

124. Herwig, B., Auswertungsverfahren bei psychotechnischen Eignungsprüfungen. *Praktische Psychol.*, 1920, **2**, 45–58.

Verfasser setzt das Wertungsverfahren der von W. Moede ausgebildeten Form der Eignungsprüfung auseinander. Die Wertung stützt sich auf die Theorie des arithmetischen Mittels. Ihr Ziel ist, für jeden Prüfling eine Profilkarte zu erarbeiten, aus der die verschiedene Entwicklungshöhe psychophysischer resp. psychischer Funktionsgruppen ersichtlich ist. Die Bedeutung einer Funktion für den Beruf wird durch Multiplikation mit einer "Gewichtsziffer" ausgedrückt, die sich aus korrelatios-statistischen Berechnungen ergibt. Der Vergleich der Werte eines Prüflings mit den aus umfangreicheren Eichungsuntersuchungen gewonnenen Durchschnittswerten entscheidet über seine berufliche Tauglichkeit.

H. Bogen (Berlin)

125. Blumenfeld, W., Zur Psychologie der Werbewirkung des Schaufensters. *Praktische Psychol.*, 1920, **2**, 81–90.

Es werden die verschiedenen Möglichkeiten der Aufmerksamkeitserregung für die Schaufensterauslagen erörtert., sowie Richtlinien für die systematische Untersuchung der Werbewirksamkeit der verschiedenen Faktoren gegeben. Die theoretischen Erörterungen werden verdeutlicht an einer Untersuchung des Verfassers über den bevorzugtesten Blickraum des Schaufensters bei der Betrachtung aus der Nähe. Die vor den Schaufenstern erarbeitete Statistik ergibt, dass der Raum in der Mitte unten einen mehr als zwanzigfach höheren Beachtungswert besitzt, als die hohen seitlichen Räume. Die praktischen Folgerungen des Ergebnisses werden dargestellt.

H. Bogen (Berlin)

126. Hische, W., Die Auslese der Begabten in Hannover. *Praktische Psychol.*, 1921, **2**, 129–142.

Die Auslese baut sich auf dem Grundsatz der Prüfung allgemein schulwichtiger Funktionen auf. Der Bericht ist dadurch

wertvoll, dass er zeigt, wie eine mehrjährige Praxis bestimmenden Einfluss auf die Entwicklung der Methode ausübt. Eine Bewährungsstatistik bringt den Erweis der Zweckmässigkeit des eingeschlagenen Weges.

H. Bogen (Berlin)

127. v. Kreusch, M., Die Graphologie im dienste der praktischen Psychologie. *Praktische Psychol.*, 1921, **2**, 154–158.

Kurzer Überblick über Entwicklung, System und Anwendung der Graphologie. Die Schriftanalyse hat mit den allgemein wesentlichen Zeichen zu beginnen und muss bis zu den kleinsten Merkmalen durchgeführt werden. Die These wird an Beispielen erläutert.

H. Bogen (Berlin)

128. Richards, E. L., The Elementary School and the Individual Child. *Ment. Hyg.*, 1921, **5**, 707–723.

Eighteen "backward" and "difficult" children from a Baltimore school were selected from the first grade for special study and therapeutic treatment. Two tested at age; the others were retarded from one to three years. These children were placed in a special class under a special teacher; their physical defects were treated; emotional and nervous disorders corrected as far as possible by appropriate treatment and discipline; and special attention was paid to the difficulties of individual children in matters of attention, learning, interest and the like. In less than a year remarkable improvement in school progress was evident in practically all cases; many showed improvement in the Binet-Simon tests; in practically all cases the non-intellectual aspects of their behavior showed improvement. "The seven children who showed a difference of two years and over between their chronological age and mental age in March, 1920, now show a mental level that coincides with their actual physical age." The author believes that such factors as shyness, indolence, fear, sensitiveness, day-dreaming, etc., may obscure the native capacity of a child to such an extent that differences between mental age and chronological age as great as three years may thus appear.

R. H. Wheeler (Oregon)

129. TAFT, J., Mental Hygiene Problems of Normal Adolescence. *Ment. Hyg.*, 1921, **5**, 741–751.

With the aid of two typical cases of maladjustment during the adolescent period, the author points out the need of a wise and scientific understanding and treatment of emotional disturbances.

R. H. WHEELER (Oregon)

130. WALLIN, J. E. W., Norms for the Sequin Form-board Based on the Averages of Three Trials. *J. of Delinq.*, 1921, **6**, 381–386.

This article makes available, in year and half-year steps, averages of three trials obtained from the author's data in *Psycho-Motor Norms for Practical Diagnosis*. The article includes a discussion of improvement with age and of sex differences.

L. I. STECHER (Iowa)

131. MATHEWS, J., Irregularity in Intelligence Tests of Delinquents. *J. of Delinq.*, 1921, **6**, 355–361.

An analysis of the scattering on the Stanford-Binet scale in the records of a group of 200 delinquent boys and 100 delinquent girls in California state schools. As a criterion of scattering, Pressey's method was used, whereby the index is taken as the number of "months worth" of success or failure in any given age group multiplied by the number of test groups which that success or failure is away from the mental age obtained. The results are not conclusive but indicate a greater tendency toward scattering among delinquents than among children of the same age in general. A comparison of I.Q.'s with irregularity shows a rather stronger tendency than has yet been found toward greater scattering among the higher I.Q.'s.

L. I. STECHER (Iowa)

132. BRYANT, E. K., The "Will-Profile" of Delinquent Boys. *J. of Delinq.*, 1921, **6**, 294–309.

The will-profile scale was given to an unselected group of 100 boys in a California institution. A number of interesting individual cases and group profiles are presented. The composite profile of the delinquent groups shows a wilful aggressive individual with a greater tendency toward accuracy and tenacity than toward adaptability. Correlation of the test scores with ratings from independent estimates is + .29; with I.Q.'s, + .38; with mental ages, + .43; with

average conduct responsive, −.22; with change in conduct response, + 26. The sharp contrast between the relatively high score in "assurance" and low score in "resistance" is the most characteristic feature of the profile of the delinquent group. It continues to be so even when compared with individuals of approximately similar chronological ages.

L. I. STECHER (Iowa)

133. MATEER, F., The Future of Clinical Psychology. *J. of Delinq.*, 1921, **6**, 283–293.

This article begins with a brief discussion of the history of mental testing. An analysis of some symptoms revealed in the psychological examinations shows the significance of the following ten points in the diagnosis of psychopathy: 1. Range above basal year on Stanford-Binet. More than four years. 2. Distribution on Stanford-Binet. 3. Quality of individual test responses on the Stanford-Binet. 4. Kent-Rosanoff association test. More than 10 individual reactions. 5. Kent-Rosanoff association test. Quality of response. 6. Lack of balance on performance test. More than four years. 7. Orientation. Very poor or very good. 8. School work. Above or below actual grade expected of intelligence level. 9. Incoherence, ambiguity, circumstantiality in own story. 10. Behavior during examination. Other qualitative criteria for the psychologist are mentioned.

L. I. STECHER (Iowa)

134. LARSON, J. A., Modification of the Marston Deception Test. *J. of Crim. Law and Crim.*, 1921, **12**, 369–380.

The test reported in this article is a modification of Marston's systolic blood pressure test for detecting deception. The only criticism of Marston's technique is in the method used. In the test which Dr. Larson reports "all important changes in blood pressure, heart rate and respiration during an extensive cross-examination are recorded . . . with special reference to the effect of emotion upon the changes." Involuntary inhibitions of breathing and movements, as well as any muscular movement the subject makes, are recorded also. Instruments used are an Erlanger and Tycos Sphygmomanometer, which makes a continuous record, a pneumograph and various signaling devices. The test was tried out in an investigation to determine who was responsible for a series of thefts among 100 girls living together in a large hall. Of the girls exam-

ined in a brief preliminary examination, three were set aside for further investigation, one of these three being the girl who finally confessed to the thefts. In addition to these three, ten volunteers selected at random from the entire group were given the modified deception test. "With one exception, the records of all the girls investigated showed a marked uniformity." In this one case there were very decided effects in respiration and in blood pressure curves. The record was not completed because the subject "blew up." A few days later she confessed to the thefts. The author has also used his apparatus successfully with experimental subjects, "such as patrolmen who volunteered to be questioned."

F. I. Gaw (Boston Psychopathic)

135. Deuchler, G., Zur Bildung von Gesamtrangreihen bei Begabungsprüfungen. *Zeits. f. päd. Psychol.*, 1921, **22**, 61–65.

Zur Herstellung völlig genauer, von besonderen Massstäben unabhängiger Leistungsreihen empfiehlt D. ein vom ihm verwendetes Verfahren, bei dem ein Quotient, gewonnen aus der Abweichung der Einzelleistung vom Mittel, sowie dem Streuungswert den Platz einer Versuchsperson innerhalb einer Leistungsreihe bestimmt.

Bogen (Berlin)

136. Giese, F., Zur Betriebsführung psychotechnischer Prüfstellen. *Praktische Psychol.*, 1921, **3**, 1–12.

Auf Grund mehrjähriger Erfahrungen in dem vom Verfasser geleiteten Provinzial-Institut für Praktische Psychologie in Halle stellt er für die Organisation Forderungen auf. Die Untersuchungen müssen voraussetzungslos vor sich gehen können. Ihre Ergebnisse müssen in einer jedem Laien verständlichen Form ausgedrückt werden können. Die Laboranten sind auf streng wissenschaftlicher Basis auszubilden. Die Prüfungen haben in immer gleicher Reihenfolge und Form abzulaufen für alle, Die Prüfmittel sind so weit als möglich zu automatisieren. Allmählich müssen an Stelle der Einzelfunktionsprüfungen geeichte Arbeitsproben zum Mittelpunkt der Diagnose werden. Alle Forderungen werden an Beispielen aus der Praxis erläutert.

Bogen (Berlin)

137. Rabeau, J., Mathematische Unterrichtserfahrungen an der Begabtenschule des Köllnischen Gymnasiums. *Praktische Psychol.*, 1921, 3, 15–20.

Das Arbeitstempo der hier zu Bericht stehenden Begabtenklasse ist gegenüber dem der Normalklassen verdoppelt. Stoffwiederholungen nehmen wenig Raum ein oder erübrigen sich ganz. Die instinktive, nicht selten spontane Treffsicherheit in der Auffindung von Wegen, die zu mathematischen Beweisen führen, ist oft erstaunlich. An dem Bild einer Unterrichtsstunde wird der bedeutende Unterschied zwischen dem Lehrvorgang in der Begabtenklasse gegenüber dem in Normalklassen dargelegt.

Bogen (Berlin)

138. Moede, W., Meisterprüfung. *Praktische Psychol.*, 1921, 3, 12–15.

Kurze Mitteilung über in der Metall- und Elektroindustrie neu eingeführte Verfahren. Es werden rein formale intellektuelle Fähigkeiten geprüft, wobei keinerlei besondere Kenntnisse vorausgesetzt werden. Hier zeigt sich, wie intellektuell hochwertige ganz anders mit dem Erfahrungsmaterial arbeiten als weniger hoch stehende. Ferner wurden Aufgaben gestellt, die dem speziellen Erfahrungskreise des Prüflings entnommen waren. Es kam jedoch auch hier nicht auf die Menge der Kenntnisse an, sondern auf die intellektuelle Verarbeitung derselben und den Überblick, den der Prüfling über die Verursachungsreihen des Werkstattgeschehens bekundet. Festgelegt wurde der Schwerpunkt der Begabung.

Bogen (Berlin)

12. MENTAL EVOLUTION

139. Schaefer, G., Untersuchungen an Medusen. 1. Teil. *Arch. f. d. ges. Physiol.*, 1921, **188**, 49–59.

Bei *Rhizostoma* und *Chrysaora* zeigt sich bei 28–32° C Wärmelähmung, bei 4–6° Kaltelähmung. Eine Wärmegewöhnung ist möglich (Tiere, die schon einmal gelähmt waren, geraten bei der zweiten Erwärmung erst bei einer um 1–2.5° höheren Temperatur in Wärmelähmung). Atropin setzt die Frequenz herab. Nicotin lähmt, Strychnin steigert die Frequenz, Curare ist ohne Einfluss.

Bethe (Frankfurt a/M.)

140. Fröhlich, A., und Kreidl, A., Pharmakologische Untersuchungen über die Wärmenarkose an marinen Krebsen (*Palaemon*). *Arch. f. d. ges. Physiol.*, 1921, **187**, 90–101.

Erwärmung über bestimmte Temperaturen bringt bei allen Tieren reversible Zustände von Refexlosigkeit hervor ("Warmenarkose"; beim Frosch z. B. 37–38° C). Verfasser finden, dass durch verdünntes Meerwasser, Vermehrung des Mg-Geholts, Strychnin, Cocain etc. der Entritt der Lähmung um mehrere Grad nach unten verschoben wird. Eine Verschiebung nach oben gelang nicht. Als Sitz der "Warmenarkose" werden die Vorderteile des Centralnervensystems angesehen. Wegen der Deutung der Versuche siehe das Original.

Bethe (Frankfurt a/M.)

141. Fröhlich, A., und Kreidl, A., Lichtreaktionen bei Krebsen (*Palaemon*). *Arch. f. d. ges. Physiol.*, 1921, **187**, 102–104.

Palaemon zeigt bei Vergiftung mit Campher oder Phenol auf Belichtung, noch deutlicher aüf Beschattung einen Refexsprung. Bei Vergiftung mit Strychnin oder Ammoniak, wo ebenfalls die Reflexe gesteigert sind, bleibt die Ueberempfindlichkeit für Licht resp. Beschattung aus.

Bethe (Frankfurt a/M.)

142. Schaefer, G., Beiträge zur Physiologie des Farbenwechsels der Fische. 1. Untersuchungen an *Pleuronectiden*. *Arch. f. d. ges. Physiol.*, 1921, **188**, 25–48.

Die Kontraktion der *Chromatophoren* bei elektrischer Reizung der Haut kann reflektorisch durch das Centralnervensystem oder (nach Ausschaltung desselben durch Curare) durch lokale Beeinflussung zu Stande kommen. Das Reflexcentrum sitzt in der Medulla (elektrische Reizung derselben giebt Aufhellung, Zerstörung der Medulla Verdunklung der Haut). Leitungsweg durch den Sympathicus; daher bewirkt Nikotin Expansion, Adrenalin Kontraktion der Chromatophoren.

Bethe (Frankfurt a/M.)

BOOKS RECEIVED

DREVER, J. *The Psychology of Everyday Life.* New York: Dutton, 1921. Pp. v + 164. $2.50.

HURST, A. F. *The Croonian Lectures on the Psychology of the Special Senses and their Functional Disorders.* London: Oxford University Press, Frowd, H., 1920. Pp. v + 123.

CAMPANELLA, T. *C. Dentice di Accadia.* Florence: Vallechi, 1921. Pp. 304.

STERN, W. *Die Differentielle Psychologie in ihren methodischen Grundlagen.* (Dritte Aufl.) Leipzig: Barth, 1921. Pp. iii+545.

LIPMANN, O. *Abzahlende Methoden und ihre Verwendung in der Psychologischen Statistik.* Leipzig: Barth, 1921. Pp. 78. M. 15.

STERN, E. *Die Feststellung der psychischen Berufseignung und die Schule.* Leipzig: Barth, 1921. Pp. 153. M. 30.

KATZ, D. *Zur Psychologie des Amputierten und seiner Prothese.* Leipzig: Barth, 1921. Pp. 118. M. 28.

WITTMANN, J. *Ueber das sehen von Schweinbegungen und Schenkorpern.* Leipzig: Barth, 1921. Pp. viii+204. M. 22.

GOLZ, B. *Wandlungen Literatischer Motive.* Leipzig: Engelmann, 1920. Pp. 94. M. 6.

FREYER, H. *Die Bewertung der Wirtschraft im Philosophophischen Denken des 19. Jahrhunderts.* Leipzig: Engelmann, 1921. Pp. 174. M. 26.

WERNER, H. *Die Ursprunge der Metapher.* Leipzig: Engelmann, 1919. Pp. viii+238. M. 14.

BISSEL, A. *The Role of Expectation in Music.* New Haven: 1921. Pp. i+74.

REED, J. *The Coal Problem.* Washington: 1921. Pp. 22.

GESELL, A. *Exceptional Children and Public School Policy.* New Haven: Yale University Press, 1921. Pp. 66.

BALDWIN, B. *The Physical Growth of Children from Birth to Maturity.* Iowa City: The University, 1921. Pp. 411.

MONROE, W. S. *Report of Educational Tests for '19–'20.* Urbana: University of Illinois, 1921. Pp. 64. 25 cts.

OTIS, A. S. *Otis General Intelligence Examination.* Yonkers: World Book Co., 1921.

HENMON, V. A. C. *Henmon French Tests and Henmon Latin Tests.* Yonkers: World Book Co., 1921.

CLARK, W. W. *Supervised Conduct-response of Delinquent Boys.* California: Whittier, 1921. Pp. 14.

Statistical Report of Infant Mortality for 1920. Baltimore: American Child Hygiene Association, 1921. Pp. 16.

The Journal of Educational Method, Vol. 1, No. 1. Chicago: 1921. Pp. 46.

Bulletin of the Massachusetts Department of Mental Diseases, Vol. 4, Nos. 3 and 4. Boston: 1920. Pp. 135.

R. S. WOODWORTH. *Psychology. A Study of Mental Life.* New York: Holt, 1921. Pp. x + 580.

S. NACCARATI. *The Morphologic Aspect of Intelligence.* (*Arch. of Psychol.*, No. 45, 1921.) Pp. 44. 70 cts.

H. H. GODDARD. *Psychology of the Normal and Subnormal.* New York: Dodd, Mead, 1919. Pp. xxiv + 349.

M. S. PITTMAN. *The Value of School Supervision.* Baltimore: Warwick & York, 1921. Pp. x + 129.

A. G. PEAKS. *Periodic Variations in Efficiency.* Baltimore: Warwick & York, 1921. Pp. 95.

W. S. HERTZOG. *State Maintenance for Teachers in Training.* Baltimore: Warwick & York, 1921. Pp. 144.

A. TRIDON. *Psychoana'ysis, its History, Theory, and Practice.* New York: Huebsch, 1919. Pp. ix + 272. $2.00.

W. LAY. *Man's Unconscious Spirit. The Psychoanalysis of Spiritism.* New York: Dodd, Mead, 1921. Pp. 337.

A. COHEN-KYSPER. *Rücklaufige Differenzierung und Entwicklung.* Leipzig: Barth, 1918. M. 3.00.

H. A. BROWN. *A Study of Ability in Latin in Secondary Schools.* Oshkosh, Wisc.: State Normal School, 1919. Pp. x + 170.

T. L. PENIDO. *La methode intuitive de M. Bergson.* Paris: Alcan, 1918. 3.50 fr.

G. OWEN. *Nursery School Education.* New York: Dutton, (no date). Pp. 176. $2.50.

J. A. GOLDBERG. *Social Aspects of the Treatment of the Insane.* New York: Columbia Univ., 1921. Pp. 247. $2.50.

W. H. R. RIVERS. *Mind and Medicine.* London: Longmans, Green, 1919. 1 sh.

NOTES AND NEWS

Dr. P. T. Young, of the University of Minnesota, has accepted an associateship in psychology at the University of Illinois.

The nomination of Dr. Walter B. Cannon, of the Harvard Medical School, to serve in the Medical Reserve Corps of the U. S. Army, with the rank of brigadier-general, has been confirmed by Congress.

At the recent meeting of the Optical Society of America, Dr. L. T. Troland of Harvard University was elected President for a term of two years.

At the recent meeting of the American Association for the Advancement of Science held at Toronto, Dr. Raymond Dodge of Wesleyan University was elected Vice-president and Chairman of Section I (Psychology).

The death is announced of Max Verworn, professor of physiology at the University of Bonn, at the age of 57 years.

At the meeting of the American Psychological Association held at Princeton, December 28–30, 1921, the following officers were elected: President, Knight Dunlap, Johns Hopkins University; Members of the Council, 1922–1924, Warner Brown, University of California, and F. L. Wells, Boston Psychopathic Hospital; Treasurer, Samuel W. Fernberger, University of Pennsylvania. Edwin G. Boring, Clark University, continues as Secretary. Nominees for appointment to the Division of Anthropology and Psychology of the National Research Council were Edwin G. Boring, Clark University, and J. McKeen Cattell, Garrison, N. Y.

On December 27, 1921, The American Psychological Association constituted a Section of Consulting Psychologists, with membership open to persons then members of the Section of Clinical Psychology. The necessary papers for taking out such membership have been mailed to the addresses of authorized persons. Any authorized person desiring these papers and not receiving them is invited to communicate with the representative of the Association's Committee, Dr. F. L. Wells, 74 Fenwood Rd., Boston, Mass. Applications received before May 10 will be completed on or about June 1.

Subsequent applications will be completed as promptly as the routine of correspondence permits, and not later than the following annual meeting of the Committee. Further notice will be given when the Committee is in a position to take up applications from persons other than those authorized as above.

A COMMITTEE of the Optical Society of America is making arrangements for bringing out an English translation of Helmholtz's *Handbuch der physiologischen Optik*, as a memorial of the hundredth anniversary of von Helmholtz's birth. It is desired that all interested may have an opportunity to contribute to the project; contributions, no matter how small, may be sent to Adolph Lomb, Esq., care of Bausch and Lomb Optical Co., Rochester, N. Y. Any one subscribing as much as $15.00 will receive a copy of the complete work when it is issued.

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THE

PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE THIRTIETH ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, PRINCETON, NEW JERSEY, DECEMBER 28, 29, 30, 1921

REPORT OF THE SECRETARY, EDWIN G. BORING, CLARK UNIVERSITY

The American Psychological Association held its thirtieth annual meeting at Princeton University on Wednesday, Thursday, and Friday, December 28, 29, and 30, 1921. The sessions were held in Murray, Dodge, and McCosh Halls. One hundred and seventy names were registered on the Association's roll, a registration that is greater than at any previous meeting. It is probable, however, that the registration has usually been less complete than it was at Princeton.

The Program Committee sought to encourage discussion by reducing the number of papers at a single session from eight to six, a policy that resulted in a total reduction of the program. In all forty-five papers were presented by members at the regular sessions. Of these papers twenty dealt with clinical psychology or mental measurement, ten with experimental psychology, eight with theoretical subjects, three with the administration of psychology, two with educational psychology, and two with industrial psychology. Discussion seemed to be more ready than it has been in recent years and it is possible that the reduction of the program contributed to this result.

An examination of the forty-five papers shows that the program of the Association consists largely of papers from younger psychologists trained in a comparatively few laboratories. The distribution of authors by the quinennium in which the author took his doctor's degree is as follows:

Date of doctorate:	1916–20	1911–15	1906–10	1901–05	Before 1900
No. of authors:	18	11	9	3	4

Of these authors 10 took their doctor's degrees at Columbia, 8 at Chicago, 7 at Harvard, 4 at Clark, 4 at Cornell, 2 at Hopkins, 2 at Pennsylvania, and one each at Brown, Bryn Mawr, Michigan, Würzburg, and Yale. This distribution is similar to the frequency of doctorates within the Association during the last five years, and also within the total membership of the Association.

Parallel sessions were held Wednesday afternoon, Thursday morning, and Friday morning. The Section of Clinical Psychology met Wednesday afternoon.

The Annual Business Meeting was held on Tuesday evening at eight o'clock. The increase of business in the Association made it advisable to devote the entire evening to business, and it was found that even with a session of two and a half hours it was impossible to consider fully all of the business brought up for action.

On Thursday afternoon there was held a special session on "Psychology In Its Social Relations." By special invitation of the Program Committee, papers were presented by Dr. Cabot of Harvard University, Dr. Paton of Princeton University, Dr. Franz of the Government Hospital for the Insane, and Dr. Campbell of the Boston Psychopathic Hospital. The papers were formally discussed by Messrs. McDougall, F. L. Wells and Woodworth; and considerable informal discussion, showing the interest of the Association in these problems, followed.

The Annual Banquet was held in Proctor Hall of the Graduate College. After the banquet Mr. W. V. Bingham announced the award of the Edison Prize, for the Most Meritorious Research on the Effects of Music, to Professor Margaret Floy Washburn in collaboration with George S. Dickinson, both of Vassar College. The title of the successful research is "The Sources and Nature of the Affective Reaction to Instrumental Music." Following the announcement of this award, Miss Washburn, as President of the Association, presented the President's address on "Introspection as an Objective Method."

The apparatus exhibit was held in Dodge Hall. Exhibits were made by the C. H. Stoelting Company and by C. W. Peterson & Co., and also by several members.

Members were housed during the sessions in The Graduate College, the Theological Seminary, and local inns and clubs. Much of the smoothness of the operation of these arrangements and of the conduct of the meetings in general was due to the management of the local member of the Executive Committee, Mr. Brigham.

Transactions of the Annual Business Meeting

The Annual Business Meeting was held on December 28, 1921, at eight o'clock in Murray Hall.

It was voted that the minutes of the twenty-ninth annual meeting, at Chicago, be approved as printed.

The Secretary announced the death of George Trumball Ladd, on August 8, 1921, aged seventy-nine.

The Secretary also made the following announcements:

That the Association was represented by Mr. Dunlap, Mr. Warren, and Mr. Witmer at the annual meeting of the American Academy of Political and Social Science at Philadelphia, May 13th and 14th, 1921.

That the Association was represented by Mr. H. L. Hollingworth and Mr. F. L. Wells at the joint meeting of the Division of Anthropology and Psychology and the Division of Medicine of the National Research Council in Washington on April 30, 1921. The joint meeting constituted a conference on the Relations of Psychiatry to Psychology.

That the Association was represented by Mr. C. E. Ferree at the inauguration of President Aydelotte at Swarthmore College, on October 22, 1921.

That the Association was represented by Mr. Cobb, Mr. C. E. Ferree, Mr. Reeves, and Mr. Troland at the meeting of the Optical Society in Rochester, N. Y., on October 24, 1921. This meeting was in commemoration of the one hundredth anniversary of the birth of Helmholtz.

The Secretary announced the following resignations during 1921: H. H. Bawden, J. A. Leighton, A. H. Lloyd, J. M. Mecklin, M. S. Pritchard, E. B. Titchener, H. C. Vincent, and N. Wilde. It was voted unanimously to request Professor Titchener to withdraw his resignation.[1]

The Treasurer's Report as printed below was read and approved.

The Treasurer reported the following estimate of resources, which include $500 for the Edison Prize, for the year 1922:

Estimate of Resources:

Cash on hand	$37.00	
Cash on deposit	613.09	
Dues (approximate)	875.00	
Interest (approximate)	50.00	
Sale of monographs (approximate)	5.00	$1,580.09

[1] Professor Titchener has since withdrawn his resignation in response to this request of the Association.

Upon recommendation of the Council the Association approved the budget of $1,775 for 1922 and authorized the withdrawal from the principal fund of $200 in order that the budget might be met. This budget is the same as the total budget printed below, except that it did not include the final item for the Standing Committee on the Certification of Consulting Psychologists.

It was voted to amend Article 3, Section 1, of the Constitution to read as follows:

> The Secretary and Treasurer of the Association shall be nominated by the Council and elected by the Association at an annual meeting, and shall serve for a term of three years.

This amendment was passed at the preceding meeting, and hence went into force by this second passage.

On recommendation of the Council it was voted to amend Article 2 of the Constitution so that the third sentence shall read:

> The President, the Secretary, and the Treasurer shall be ex officio members of the Council.

Since this is the first passage of this amendment, the matter goes over for second passage in 1922.

It was voted to adopt the thirteen By-laws, printed in the 1921 Year Book and embodying previous actions of the Association, with the exception that on recommendation of the Council the thirteenth By-law was adopted so as to read:

> The Secretary of the Association shall be paid annually a stipend of $250, and the Treasurer a stipend of $50, for expenses in attending meetings and for clerical and other assistance.

On recommendation of the Council it was voted to elect Mr. Fernberger Treasurer of the Association for the term 1922–1924.

The Secretary announced for the Council the appointment of a Program Committee for 1922, consisting of Miss Washburn, Mr. Dodge, and the Secretary.

On recommendation of the Council it was voted to elect Mr. Bott as representative of the Association for 1922 on the Council of the American Association for the Advancement of Science.[2]

[2] After the meeting it was discovered that the Association now includes in its membership more than one hundred Fellows of the American Association for the Advancement of Science and is therefore entitled to two representatives on its Council. The Council of the American Psychological Association therefore appointed the Secretary to serve with Mr. Bott as representative on the Council of the American Association for the Advancement of Science.

The Secretary announced that, in spite of the invitations from Vassar, Pennsylvania, and Clark, the Council recommended that the Association meet on December 27–29, 1922, in Boston with the American Association for the Advancement of Science. The recommendation of the Council was adopted.

On recommendation of the Council Mr. Allport was elected local member of the Executive Committee for 1922.

The Secretary announced the recommendation of the Council that a committee of three be appointed to consider a plan for the preparation of a library check list of psychological books. The recommendation was amended to give the Committee power. The motion as adopted was that the President be empowered to appoint a committee of three to consider a plan for the preparation, in conjunction with the Committee of the American Library Association, of a library check list of unusual and infrequently used psychological books, and to report upon the feasibility of the plan to the Association, or to act in furtherance of the project. No appropriation, however, was provided for the Committee.[3]

On recommendation of the Council the following twenty-three persons were elected to membership in the Association:

1. Bird, Charles, Ph.D., Instructor in Psychology, University of Minnesota.
2. Bishop, Homer Guy, Ph.D., Instructor in Psychology, Cornell University.
3. Bock, Carl William, Ph.D., St. Louis Public Schools and private psychological practice.
4. Buckingham, B. R., Ph.D., Professor of Education and Director of Bureau of Educational Research, Ohio State University.
5. Buswell, Guy Thomas, Ph.D., Assistant Professor of Education, University of Chicago.
6. Clark, Ruth Swan, Ph.D., Psychologist, Vocational Guidance Bureau, New York City.
7. Cobb, Margaret E., Ph.D., Instructor, Research and Clinical Assistant, Yale University.
8. Gilbreth, Lillian Moller, Ph.D., Psychologist, Frank G. Gilbreth, Inc.
9. Ide, Archie Lewis, Ph.D., Head of Department of Education and Philosophy, Major Professor, Alfred University.
10. Lundholm, Helig, Ph.D., Resident Psychologist, McLean Hospital; and Assistant in Psychology, Harvard University.
11. Miller, Wilfred Stanton, Ph.D., Associate Professor of Education, University of Minnesota.
12. Moore, Bruce Victor, Ph.D., Assistant Professor of Psychology, Pennsylvania State College.
13. Naccarati, Sante, Ph.D., Assistant Physician, Neurological Institute of New York.

[3] The retiring President subsequently appointed Mr. Angier, chairman, Mr. Warren, and Mr. Weld.

14. Paynter, Richard H., Jr., Ph.D., Associate Psychologist, New York Neurological Institute.
15. Peterson, John Christian, Ph.D., Professor of Educational Psychology, State Agricultural College, Kansas.
16. Pratt, Carroll C., Ph.D., Instructor in Experimental Psychology, Clark University.
17. Reiter, Frank Horace, Ph.D., Psychologist, Public Schools, Newark, N. J.
18. Rogers, Herbert W., Ph.D., Instructor, Department of Psychology, Yale University.
19. Rugg, Harold O., Ph.D., Educational Psychologist and Associate Professor of Education, Teachers College, Columbia University.
20. Stone, Calvin P., Ph.D., Instructor in Neurology and Psychology, University of Minnesota.
21. Sunne, Dagny, Ph.D., Assistant Professor of Psychology, Newcomb College, Tulane University.
22. Taft, Jessie, Ph.D., Director of Department of Child Study, Seybert Institution and Children's Bureau, Philadelphia, Pa.
23. Tait, William Dunlop, Ph.D., Associate Professor of Psychology, McGill University, Montreal, Canada.

The President then called for Reports of Committees.

Mr. Franz reported for the Committee on the Election of Officers the following elections:

President, Knight Dunlap, The Johns Hopkins University.

Members of the Council, 1922–1924, Warner Brown, University of California; F. L. Wells, Boston Psychopathic Hospital.

Nominees for appointment to the Division of Anthropology and Psychology of the National Research Council, Edwin G. Boring, Clark University; J. McKeen Cattell, Garrison, New York.

Mr. F. L. Wells presented the Report of the Standing Committee on the Certification of Consulting Psychologists. It was voted to take up the Report by sections. Sections 1 and 2 were adopted. Section 3 was amended by striking out the phrase "such as that now known as the Clinical Section," which was included as descriptive of the new section therein provided. Section 4 was adopted. Section 5 was amended by the insertion of the sentence: "A member of this section is understood to be a person qualified to make by psychological methods of study independent judgments concerning the mental status and adjustments of individuals; to take proper account of factors derived from other sources of information, as medical, social, and educational, in formulating his judgments; and to devise special methods of work adapted for special problems." Other motions to amend Section 5 were lost or withdrawn, and the Section was adopted as amended. Section 6 was adopted. It was voted not to adopt Section 7. No action was taken on Section

8 since it was dependent upon the adoption of Section 7. The action on Sections 7 and 8 was equivalent to the refusal of the Association to support the recommendation of the Committee for the establishment of Licentiates in Mental Measurement for persons not members of the Association. Section 9 was amended by striking out the sentence that refers to the fees payable by Licentiates. A motion that the fees be payable to the Treasurer of the Association was lost, and the Section was adopted as amended. Sections 10 and 11 were adopted as recommended by the Committee. Section 12 was amended by the insertion of the word "hygienic" with the words "medical" and "psychological," by the change in the name of the Committee to "Standing Committee of the American Psychological Association on the Relation of Psychology to Public Welfare," and by the addition of the following provision: "The Committee shall be elected by the Association on nomination of the Council, and shall consist of five members, one member to serve for one year, one for two years, one for three years, one for four years, and one for five years; and thereafter one member shall be elected annually to serve for a term of five years." The Section as thus amended was adopted. It was voted that the budget of the Standing Committee on the Certification of Consulting Psychologists be approved annually by the Association and that its accounts be audited by the Auditing Committee of the Association.[4]

The Report as thus amended and as finally adopted by the Association is printed below with the paragraphs renumbered.

It was voted that the Treasurer be authorized to withdraw from the principal fund the sum of $100 to be placed at the disposal of the Standing Committee on the Certification of Consulting Psychologists as a revolving fund.

Mr. Warren reported for the Committee on Terminology that the Committee had continued its work and reached a substantial agreement on about twenty-four psychological terms. At the request of the Committee it was voted to authorize the continuation of the Committee and the printing of its findings on the responsibility of the Committee.

Mr. Seashore reported for the Committee on the Relation of the Association to Publication that the Committee had been unable to reach an agreement. It was voted, on the recommendation of the

[4] The retiring President has appointed Mr. F. L. Wells as the Executive Officer of the Standing Committee, and has reappointed Mr. B. T. Baldwin, whose term had expired, to the Committee.

Committee, that the Association accept the proposal of Dr. Yerkes to gather data as to the cost, circulation, etc., of all existing psychological periodicals, that the present Committee be discharged, and that a new Committee be appointed by the incoming President to review the results of the investigation to be made by Dr. Yerkes and to formulate general recommendations to the Association.[5]

Mr. W. V. Bingham reported for the Committee on the Award of the Edison Prize for the Most Meritorious Research on the Effects of Music that manuscripts had been reviewed by the Committee and the prize awarded, and that announcement of the award would be made at the annual banquet.

Mr. Dunlap presented the Report of the Committee on Requirements for Membership as printed below. It was voted to take up the Report by sections; to adopt Section 1; to lay Section 2 upon the table; to receive Section 3 and place it on file; and to accept the report as a whole and discharge the Committee with thanks.

The President then called for new business.

On motion of Mr. Franz it was unanimously voted to extend to Princeton University and to the Department of Psychology of Princeton University the grateful thanks of the Association for the entertainment provided.

The meeting adjourned at 10:35 P.M.

EDWIN G. BORING,
Secretary.

REPORT OF THE TREASURER FOR THE YEAR 1921

DR.

To balance from the previous year	$ 1,571.23	
Dues received from members	834.00	
Interest from July 1, 1920, to July 1, 1921	51.96	
Edison Prize	500.00	
Sale of Monographs, 51–53, in 1920	6.12	
Miscellaneous	.50	$2,963.81

CR.

By Printing and Supplies	$382.84	
Postage	56.94	
Reprints	114.97	
Abstracts	50.00	
Incidentals of 1920 meeting	3.90	
Election Committee 1921	56.63	
Secretary's Stipend for 1921	250.00	

[5] The incoming President subsequently appointed Miss Washburn, chairman, Mr. Franz, and Mr. Langfeld.

Exchange on Checks	1.80		
Committee on Qualifications and Certification of Consulting Psychologists	44.09		
Standing Committee on Certification of Consulting Psychologists	14.12	$975.29	
Cash on hand	37.00		
Balance in Fifth Avenue Bank	613.09		
Balance in Union Dime Savings Institution	1,338.43	$1,988.52	$2,963.81

WORCESTER, MASSACHUSETTS,
December 20, 1921

EDWIN G. BORING,
Treasurer

Audited and found correct:
GEORGE F. ARPS,
WALTER S. HUNTER

BUDGET FOR 1922

The total budget for 1922 as adopted by the Association is as follows:

Printing and Supplies	$400.00	
Postage	100.00	
Addressograph and cabinet for plates	80.00	
Reprints	150.00	
Abstracts	100.00	
Incidentals of meeting	50.00	
Apparatus exhibit	25.00	
Election Committee	70.00	$975.00
Secretary's stipend		250.00
Treasurer's stipend		50.00
Edison prize		500.00
Standing Committee on Certification of Consulting Psychologists		100.00
		$1,875.00

Since the Treasurer's estimate of resources for 1922 was $1,580.09, the Association authorized a total withdrawal from the principal fund of $300 to meet the budget.

REPORT OF THE STANDING COMMITTEE ON THE CERTIFICATION OF CONSULTING PSYCHOLOGISTS

The report of the Standing Committee on the Certification of Consulting Psychologists is printed below as amended and adopted by the Association. The sections are renumbered so that sections 7, 8, 9 and 11 correspond respectively to sections 9, 10, 11 and 12 of the original report as referred to in the minutes of the business meeting. Section 10 below is a new section added by the business meeting.

1. Your committee find that the field in which certification of consulting psychologists is now practicable, is limited to that concerned with the measurement of various types of intelligence, and special abilities therein.

2. It is recommended that the initial steps in certification be taken by this Association, as a centralized authority for the national maintenance of standards.

3. It is recommended that certification as consulting psychologist by this Association be constituted through membership in a section of the American Psychological Association.

4. Your committee find the term Clinical Psychology not representative of the functions of the section contemplated and recommend that it be not applied thereto.

5. It is recommended that the Association constitute a section of Consulting Psychologists. Every person now a member of the Clinical Section of the American Psychological Association shall have the right to membership in the Section of Consulting Psychologists and certification thereof, upon applying therefor prior to Jan. 1, 1923, and the payment of the requisite fee ($35). Other membership in the Section shall be awarded under the Rules of the constituted Standing Committee of the Association thereon, to qualified members of the American Psychological Association. The basic requirement of membership is a doctoral degree in psychology, education or medicine or equivalent qualifications. A member of this Section is understood to be a person qualified to make by psychological methods of study independent judgments concerning the mental status and adjustments of individuals; to take proper account of factors derived from other sources of information, as medical, social and educational, in formulating his judgment; and to devise special methods of work adapted for special problems. No application is accepted save upon affirmative vote of four members of the Committee.

6. Certificates under paragraph 5 are in force only during the continuance of membership in the Section and cease upon the termination of such membership. A certificate is documentary evidence of the Association's action only when supported by a receipt for the Association's dues for the current year.

7. Total fees for membership in the Section shall be $35. All fees are payable to the Executive Officer of the Committee.

8. The funds at the disposal of the Committee shall be the income derived from its fees.

9. The Committee shall administer the details of its work in such manner as it shall deem most efficient, in accordance with the provisions of this report, and as embodied in the Rules of the Standing Committee.

10. The budget of the Standing Committee on the Certification of Consulting Psychologists shall be approved annually by the Association and its accounts shall be audited by the Auditing Committee of the Association.

11. It is recommended that there be constituted a Standing Committee of the American Psychological Association on the Relation of Psychology to Public Welfare. Its general duties shall be to represent the Association in matters pertaining to the correlation of medical, hygienic, and psychological training, the use of psychological measurements in education and the legislative control of psychology. The Committee shall be elected by the Association on nomination of the Council, and shall consist of five members, one member to serve for one year, one for two years, one for three years, one for four years, and one for five years; and thereafter one member shall be elected annually to serve for a term of five years.

Report of the Committee on Requirements for Membership

The report of the Committee on Requirements for Membership is printed below. Section 1 of the report was adopted, section 2 was laid on the table, and section 3 was ordered filed.

1. Requirements for Membership

The Committee is of the opinion that the qualifications for membership should be maintained at the level intended by the rule now in force, but that the definition of the requirements should be made more explicit and should then be strictly enforced by the Council. The Committee believes further that the qualifications should be formulated in accordance with the object of the Association, "the advancement of psychology as a science," as stated in the constitution; and they believe that this end will be most readily secured by placing emphasis upon scientific publication. They believe further that the time has come to abandon professional position or title as a basis for election on account of the reason that the multiplication of special positions, especially in non-academic fields of psychology, makes the interpretation of the significance of position impracticable.

(*a*) The Committee recommends the adoption of the following by-law to be substituted for number 3 of the proposed by-laws printed in the Year Book for 1921:

"A nomination for membership must be signed by at least two members of the Association, and must be submitted to the Secretary, for the Council, at least one month in advance of the annual meeting. The nomination must contain such information concerning the nominee's academic and professional history as shall be prescribed by the Council and indicated by it upon a printed form of nomination. No nomination that is incomplete shall be considered by the Council, and, except for special reasons stated in the nomination, no nomination that is unaccompanied by copies of the nominee's published research shall be considered by the Council.

"The conditions for membership shall not be considered as having been fulfilled in the absence of (1) acceptable published research of a psychological character and (2) of the degree of Doctor of Philosophy, based in part upon a psychological dissertation. The Council is empowered, however, in special cases to waive the requirement of the degree, provided it so states in recommending the nominee to the Association and presents its reasons for the exception. It is also expected that the Council shall assure itself that the nominee is actively engaged in psychological work at the time of the nomination."

(*b*) The Committee appends to this report a form of nomination blank which it believes will enable the Council to act objectively upon qualifications. It does not recommend, however, that the Association adopt any specific form of blank, but believes that the matter should be left to the Council.[1]

[1] The Council has adopted as a nomination form an "information sheet," upon which the personal data of the nominee are to be given, and a "nominating sheet," upon which a nominator answers certain questions or makes remarks in support of the nomination. A nomination therefore consists of two nominating sheets, each filled out completely and signed by a nominator, and an information sheet, which may be filled out by the nominee but preferably is filled out by a nominator. The filling out of any part of the form for nomination by the nominee tends to make the nomina-

tion partake of the characteristics of an application. For this reason the Council has instructed the Secretary to furnish forms for nomination only to members of the Association and never to "candidates" for membership.

2. Fellows

The Committee believes that the interests of psychology would be advanced by the creation within the Association of a group of psychologists of a more advanced degree of scientific attainment than is implied by admission to membership in the Association. To this group matters of especial importance for the advancement of psychology could be referred, and its collective opinion in such matters could be expected to carry especial weight.

The Committee therefore recommends the establishment of a group of approximately one hundred Fellows within the membership of the Association; and the appointment of a new committee to consider the mode of election of these Fellows, their qualifications, their functions, if any, within the Association, and other matters connected with the establishment of the new grade of membership.

3. Foreign Members

The Committee was instructed to take under advisement the matter of the creation of a class of foreign members within the Association. There are three functions which foreign memberships might fill: (1) they might be honorary memberships granted to distinguished psychologists, or (2) they might be corresponding memberships granted to psychologists who in some way represent their country in its relation to American psychology, or (3) they might be ordinary membership held by persons not resident in America. The Committee is not aware of any conditions which render especially desirable the creation of the first two types of membership, and believes that they should not be created unless a strong demand for them is initiated within the Association. With respect to the third type the Committee begs to point out that the Council is not now prevented from recommending to membership persons not resident in America.

For these reasons the Committee makes no recommendations concerning the creation of foreign memberships.

Knight Dunlap,
Lewis M. Terman,
Edwin G. Boring, *Chairman*

LIST OF PAPERS

H. C. McComas, Discrimination Reactions and Attention.
G. E. Bird, Devious Path of Slow Work.
F. C. Dockeray, Attention and Coördination Under Fatigue.
W. Brown, Prediction of Learning and Achievement.
C. E. Seashore, Division of Anthropology and Psychology.
H. C. Bingham, Activities of American Psychologists.
H. A. Toops, Institute of Educational Research.
P. Blanchard, Intelligence Tests in Psychiatric Work.

D. Mitchell, Intelligence of Pre-school Age Children.
C. F. Chassell, Relation of Morality to Intellect.
A. H. Arlitt, Intelligence and Age in Negro Children.
A. F. Bronner, Critique of Tests for Ethical Discrimination.
G. S. Gates, Individual Differences and Practice.
J. E. W. Wallin, Intelligence Irregularity.
J. R. Kantor, Science of Social Psychology.
A. A. Roback, Behavior and Group Psychology.
R. M. Ogden, Are There Any Sensations?
E. C. Tolman, Concerning the Sensation Quality.
C. A. Ruckmick, Functional Aspects of Structural Process.
F. H. Allport, Theory of Feeling and Emotion.
E. S. Robinson, Concept of Compensation.
A. M. Jordan, Intelligence Tests and Grades.
W. S. Hunter, Correlation of Maze and Otis Examination.
F. R. Robinson, Effects of Loss of Sleep.
B. Johnson, Fatigue and Blood Sugar Tests.
A. I. Gates, Constituent Elements of Reading.
J. Peterson, White and Negro Children in Multiple Choice.
J. F. Dashiell, General vs. Particular Habits in Learning.
J. E. Anderson, Mirror Pencil Maze.
E. B. Twitmyer and S. W. Fernberger, Differential Color Mixer.
P. T. Young, Mirror Color Mixer.
G. Rand, Perimenter with Campimeter Features.
C. E. Ferree, Some Factors Affecting Visual Functions.
C. Ladd-Franklin, Practical Logic and Color Theories.
R. C. Cabot, Psychology in Relation to Social Work.
S. Paton, The Biology of Sanity.
S. I. Frantz, Psychology and Psychiatry.
C. M. Campbell, What Can Psychology Contribute to Our Knowledge of the Mechanisms of Mental Disorder?
Address of the President, Margaret Floy Washburn, Vassar College. "Introspection as an Objective Method."
L. M. Chassell, Success in Educational Leadership.
A. S. Edwards, Quantitative Investigation of Study.
B. T. Baldwin, Relation Between Mental and Physical Growth.
E. Frost, Mental Attitude of the Labor Leader.
H. D. Kitson, Output of Compositors Under Wage Incentive.
C. S. Yoakum, Selecting Salesmen.
H. H. Goddard, A Case of Double Personalty.
E. Bagby, Etiology of Phobias.

H. L. Hollingworth, Psychology of Idiosyncrasy.
A. Gesell, Comparison of Superior Duplicate Twins.
L. M. Terman, Study of Genius.

ABSTRACTS

Continuous Discrimination Reactions as a Measure of the Attention. H. C. McComas, Princeton University.

The experiment was designed to detect fluctuation of the attention when engaged in a specific task. To obtain an objective record of such possible fluctuation the subjects were required to react as quickly as possible to a succession of varying stimuli. The rate of the appearance of the stimuli depended upon the rate of reaction. The quickness of the reactions and the number of wrong reactions were recorded upon a moving paper tape. The reacting continued over a period of ten minutes during which time the subject concentrated his entire effort upon the speed and accuracy of his discriminating reactions.

The records were taken early in the morning, at mid-day, in the late afternoon and at night, for a number of days. Five graduate students and three children acted as subjects.

The records show individual differences in quickness and correctness of discrimination reactions and also indicate a conspicuous fluctuation of the attention in certain cases.

The Devious Path of Slow Work. Grace E. Bird, R. I. State College and R. I. College of Education.

In industrial processes fast motions have been found to be less devious and therefore different in character from slow motions. In mental processes a similar distinction exists between rapid adjustment and slow adjustment. The longer the completion of a mental process is delayed the larger the number of "irrelevant bonds" formed and the more devious the method of procedure.

Experiments with large numbers of individuals and extending through several years indicate a close relationship between rapidity and accuracy. Similar results have been reached in correlating accuracy and speed in standard educational tests. The reactions of one hundred college students who were tested with both slow and rapid addition contribute evidence that if it were possible to reproduce the "motion paths" of the distractions experienced in

slow mental work the result would be a tangled skein as intricate as the motions of the slow industrial worker. The large percentage of errors during slow adding and the variety of irrelevant mental content indicate that the nature of the work is different from that of rapid adding.

It has been found that in silent reading also the development of speed is accompanied by a decrease in the number of regressive eye movements and by the setting up of habits of regular, rhythmical eye movements. Reproduction of the by paths of eye and throat tensions, inner speech and imagery of the slow reader, compared with the direct route of the rapid reader, parallels the roundabout procedure of the individual who adds slowly.

Rapid drill from the beginning "focalizes" and initiates habit without superfluous behavior. Learners should think in terms of results more than in terms of the process. This economical method encourages speed and is therefore more conducive to concentration because in less danger of distraction elements that tend to alter the *character* of the work.

Attention and Coördination under Fatigue and Allied States. F. C. Dockeray, Ohio Wesleyan University.

The present experiment is the outcome of an earlier study of fatigue and discrimination in which four telegraph sounders were used. These were adjusted to produce clicks of very nearly equal quality and intensity. The subject was required to press a key in recognition of one of them, the sounds occurring in irregular order. While for some purposes the method was quite satisfactory, it was found that for trained subjects the test was not sufficiently sensitive, even when the series was made as difficult as possible. Very often under the most extreme conditions the subject was able to adjust sufficiently to the situation to produce a normal record. Many modifications were introduced, the most important of which was suggested by the experiment devised by Dunlap and his associates for the low oxygen tests in the Air Service. In the present arrangement the subject must react not merely to one of the sounds, but must discriminate and react to each. The test is further complicated by the introduction of lights of different intensities and by the replacing of the reactor's key by a stylus and a series of holes in a brass plate corresponding to the sounds and lights. These holes may be interchanged at the discretion of the experimenter. A correct response requires the touching of a plate below the correct

hole within a definite limited period. Correct contacts and contacts on the upper plate (fumbles) are automatically recorded. An automatic contact apparatus produces the stimuli in the proper order.

The results indicate that this method is much more sensitive than the simpler method. The influence of attention upon speed and accuracy of motor coördination is readily demonstrated. On the other hand, fatigue may cause a slowing of the motor processes, which then require greater attention with a consequent confusion of the stimuli.

The Prediction of Rate of Learning and Final Achievement in Practice Experiments. WARNER BROWN, University of California.

Data were obtained from groups of students who practiced upon several performances all within the same hour once a week for 13 weeks or longer. The performances were, for a group of 68 women: Naming 400 color spots, pitching at a target, balancing a stick on one finger, packing spools for 5 minutes, and a complex mechanical operation requiring for 10 minutes rapid, continuous and accurate coördination of hands and feet. For 52 men and women used as a control group the tasks were color naming, packing spools, stick balancing, and writing digits for symbols on five sheets each of which required 125 substitutions.

Early proficiency in one of these experiments does not give reliable indications concerning first or final performance in another. Early proficiency in any one task is a reliable indication that the individual will be able to retain a relatively high position in that one performance throughout the course of practice. Combining the scores in several performances increases somewhat the predictive value of the first trial. But among the individuals who finally attain the highest proficiency there are some whose early records were only fair and some whose early records were among the poorest. In one experiment one person who did not reach the median level until the seventh practice finally became the most expert after passing 67 out of 73 competitors. Another passed 59 competitors, another 46, and another 41.

Ability to make a noteworthy improvement is not a characteristic extending over several performances but is generally limited to one performance.

Ability to improve, even in a single function, is not indicated by early performance or by rapid initial learning.

These observations are not materially affected by the nature of the performance within the group of tasks used, except that color-naming does not show cases of rapid learning overcoming initial incompetence.

Aims and Progress of the Activities in the Division of Anthropology and Psychology in the National Research Council. C. E. SEASHORE, National Research Council.

This paper is a report from the Chairman of the Division of Anthropology and Psychology of the National Research Council on matters pertaining to psychology in the Council. The work of the year is briefly reviewed with concrete illustrations of service in pure and applied psychology, and particularly of the work of integrating psychology with the other sciences at national headquarters. The paper will be published in full.

Interests and Activities of American Psychologists. HAROLD C. BINGHAM, National Research Council.

By means of the Findex punch card system the records of American psychologists on file in the Research Information Service of the National Research Council have been arranged to provide available information about different subjects of psychological inquiry. In addition to usefulness in meeting varied informational demands, this method has proved valuable in reviewing trends of professional interest and activity.

From the indexed personnel records it has been a simple task to determine the frequency of professional activity or interest in a given specialty. Similarly it has required only a few minutes' work to obtain evidence of the changes in activity at different periods. For various purposes the Findex method has proved both versatile and expeditious.

This method of evaluating the trends of psychology contrasts in certain respects with efforts to measure degree of specialization and activity through classification of the literature for certain periods or through surveys of departmental and laboratory organization in academic institutions. As in some of the physical sciences, there may be tendencies in the development of psychology today which are not adequately revealed by the usual academic standards of publication, association membership, et cetera. In spite of obvious difficulties, a survey of the activities of the individuals behind any movement probably offers the most promising

and certainly the most significant method of evaluating its course and status.

This study presents graphically distribution of activities among various specialties, and furnishes illustrations of the kinds of information which can be obtained from the personnel file of psychologists or of any scientific group similarly findexed. Preponderance of interest at present in applied psychology is readily demonstrable by this method. Change from speculative to experimental interest also is revealed. Demonstration of the frequency with which interests in psychology are combined with related fields of inquiry is another illustration of the use of the Findex file.

Information concerning American scientists and technologists is available to all who care to consult the files either by correspondence or inspection.

The Vocational Research of the Institute of Educational Research. HERBERT A. TOOPS, Teachers College.

The aims of the Institute are to: (1) develop methods, and (2) construct scales, for general occupational groups rather than specific occupations or jobs.

A practical scale for guidance to a general occupational group must correlate well with a valid industrial criterion of the general ability being measured. It must also correlate low with measures of other general abilities, particularly general intelligence.

On account of the higher multiple correlations thus made possible, the "general ability" concept would gradually disappear in favor of the "specialized abilities" concept if there were available a technique of easily constructing scales for specialized abilities. This need is partly filled by a new technique of solving multiple correlations and regression equations. Some advantages of the new method are:

1. Speed. Two persons aided by a calculating machine may compute from the raw intercorrelations the weights of fifteen to twenty tests of a scale in ten hours.

2. High validity of scales. The *n* best tests of a much larger number of tests tried out on an experimental group may be selected statistically, rather than subjectively. These may be combined into a scale of higher validity than hitherto practically possible.

3. Pliability of scale. With the tests of the scale arranged in order of decreasing amounts of independence of later tests upon the preceding tests of the scale, a part only of the scale may be admin-

istered, the tests still retaining their proper regression weights with respect to each other, thus allowing the shorter form of the scale to yield its maximum multiple correlation.

The results of such a selection of tests for guidance to specific jobs are presented. Other factors affecting test results, such as length of test, repetition of test, practice, coachability, are being considered.

Value of Psychiatric Training for the Clinical Psychologist. PHYLLIS BLANCHARD, Bellevue Hospital.

A somewhat new but fertile field. Intelligence tests are utilized with various types of patients besides those apparently deficient mentally. The types of reaction to the tests as well as the rating on the examination are of diagnostic significance. There are certain definite reaction-patterns to the Stanford-Binet and Performance Scales which indicate mental disorders other than primary amentia. Types of response which indicate probable existence of psychosis, as uneven distribution of performance, slowness of reaction time, irrelevancy of response, etc. The skilful psychologist can aid the psychiatrist in the detection of psychotic symptoms in patients who are so seclusive or who have so mild a psychosis that their existence is difficult to establish. The use of intelligence tests in these cases leads to the saving of much time and energy. The psychologist as consultant for the physician.

Much data are obtained in work with psychopathic subjects which is relevant to the problems of clinical psychology. Fluctuation of the I.Q. in emotionally unstable subjects, and subjects who are suffering from emotional disturbances but have no pathological symptoms. Necessity for retesting in such cases before diagnosis. Post-encephalitic states which simulate feeblemindedness, in which the prognosis indicated is probability of improvement. Necessity of supplementing the Binet by the Performance Scale in these cases and necessity of repeating tests at intervals for obtaining accurate estimates of the intelligence of such subjects. Fluctuation of the I.Q. in drug addicts as taken when subject is suffering from withdrawal symptoms and after the administration of the drug, or as taken immediately after a cure and after sufficient time has elapsed to permit the subject to become emotionally stabilized. Implications for clinical psychology.

Value of experience with psychopathic types to the clinical psychologist. Many cases encountered in court work present psy-

chotic symptoms. In these cases, both a low rating on intelligence tests and delinquent conduct may be traced to psychotic states rather than to mental deficiency. The psychologist can recognize this distinction only if familiar with the reaction-patterns of psychotic subjects. Experience with psychopathic subjects is also of value in work with children, because it enables the examiner to recognize personality types which may later develop definite psychotic symptoms unless preventive measures are instituted.

The Intelligence of Pre-school Age Children. DAVID MITCHELL, New York City.

During the month of June, 1921, the members of the New York State Association of Consulting Psychologists examined over 1,000 children who would enter school in the following September. These examinations were made for the purpose of organizing school classes on the basis of the intelligence of the children.

The work was done in eight schools, four of which were in a district with a population predominantly Italian and the other four where the population was mostly Jewish. For the majority of the children examinations were limited to the use of the Stanford revision of the Binet-Simon series. In some cases when language or other difficulties made it necessary, a Seguin Formboard or the Manikin of the Pintner-Patterson was used.

The results reported include only those children for whom we were able to secure intelligence quotients. There were 978 of them. The distribution of I.Q.'s ranges from 40 to 120, with mode between 80 and 89. It had been thought that among the Italian children we would find lower scores than among the Jewish because of a possible greater language difficulty with certain tests of the series. A noticeable difference was not found. One child in the Italian school had an I.Q. less than 50 but the condition had been recognized and the child had been kept from school several years. The distribution of the two groups is quite similar and the average intelligence quotients are 93 and 92 for the two groups respectively.

A few of the children were under four years in chronological age and were preparing to enter kindergarten but the majority of them were just old enough to enter first grade. In chronological age they were much more nearly alike than in mental age.

The chronological ages have a fairly regular distribution with mode between five and six years.

These results show the wide divergence in ability of children entering school and should lead to a recognition of the necessity of

making psychological examinations of young children so that those who can do approximately the same amount of work can be grouped together.

The Relation between Morality and Intellect. CLARA F. CHASSELL, Teachers College, Columbia University.

Purpose of the Study:

To discover whether the findings of investigators as to the correlation between desirable qualities, studied particularly in the field of mental abilities, hold also when the relation between morality and intellect is investigated.

Method and Sources of Data:

1. A summary of previous statistical and experimental studies.

2. A study by the ranking method of approximately 1,000 students in 28 colleges and universities, judged by from one to six members of the faculty in the respective institutions, in the traits "morality in the broadest sense," "intellect as shown in studies," and "intellect as shown in activities other than studies."

3. A study by the same method of more than 200 of these students, judged by a number of their classmates, in the traits "unselfishness," "loyalty to school and friends," "justice to all," "courage in support of convictions," "self-control," "activity for social welfare," "reliability," "intellect as shown in studies," and "intellect as shown in activities other than studies."

4. A supplementary study of the relation between faculty and student judgments thus obtained, and college grades.

5. A determination of the correlation between scores in conduct scales and general intelligence tests in the case of more than 100 elementary school children.

Results:

1. The range for the correlations between morality and intelligence as found by various investigators, with a single element as the measure of morality, extended from .23 to .79. The average correlation was .48.

2. The range of certain correlations found for these traits, with two or more elements as the measures of morality, extended from .21 to .83, with a median of .51.

Thus the correlations in the investigation point to a relationship between morality and intellect when the study is confined to restricted groups, of approximately .50, and justify the conclusion that, in this field also, correlation and not compensation is the rule.

The Relation of Intelligence to Age in Negro Children. ADA HART ARLITT, Bryn Mawr College.

This investigation was undertaken to determine whether such differences as have been shown to exist between negro and white intelligence are constant from age to age.

The subjects were 243 negro children, 180 of whom were selected at random from the Playground and the public and private schools of New Orleans and 63 of whom came from the schools in the neighborhood of Philadelphia. All of the New Orleans and 36 of the Pennsylvania negroes were tested by the writer. The remaining 27 were examined by four Graduate students. In the latter case the replies were recorded as far as possible verbatim and were graded in consultation with the writer. The tests used were the Stanford Revision of the Binet Tests.

Of the total group 129 were boys and 114 were girls. At ages five and six combined there were 28 boys and 26 girls, at age seven 25 boys and 25 girls, at age eight 25 girls and 25 boys, at age nine 25 boys and 24 girls and at ages ten to fifteen combined 26 boys and 14 girls. As to social status 33.7 per cent. were very inferior, 58 per cent. inferior, 6.5 per cent. were average and 1.6 per cent. very superior. There was an approximately equal proportion of children from all social groups, except the very superior, at each age.

The median intelligence quotient for negro children does not remain constant from age group to age group as it has been shown to do for native- born whites. Both the median I.Q. and the 25 and 75 percentiles show a progressive decrease with increasing age. At ages five and six combined the median I.Q. is 100, at age seven 90.9, at age eight 87.5, at age nine 83.9 and at ages ten to fifteen combined 78.9. Compared with Terman's I.Q. of 93 for native-born whites of inferior social status to which this group is most nearly comparable, the median I.Q. for negroes is above average at ages five and six combined and falls below average at every age beyond these, decreasing steadily with increasing age. Certain peculiarities in the tests account in part for this phenomenon.

As to sex differences girls are superior to boys by 6 points at ages five and six combined. Beyond these ages there is no significant difference as to median I.Q. There are more girls than boys with I.Q.'s above 110 and more boys than girls with I.Q.'s below 70.

Experimental Critique of the Foundation of Tests for Ethical Discrimination. AUGUSTA F. BRONNER, Judge Baker Foundation.

The recent considerable interest in ethical discrimination tests calls for a critical attitude concerning their foundations. On the basis of known conduct tendencies, can we find such tests diagnostic? A method for such critical attitude might be evolved by using well-known material, such as the fables test in the Stanford-Binet Series. Comparing responses of delinquents and non-delinquents, what does one find? There is a necessity, of course, for comparison according to mentality and chronological age-levels. There is opportunity for supplementing such a comparative study by noting important specific individual reactions and their value for prognosis.

Individual Differences: Studied by Means of a Practice Experiment. GEORGINA S. GATES, Barnard College.

Occasionally investigators find a negative or zero correlation between "desirable mental traits." In studies of the school subjects, certain tests have been found to have a high inter-correlation in one school or locality, and a low inter-correlation in another.

That the cause of apparent inconsistencies may be inequality of previous practice is suggested by an experiment in which twenty-three individuals repeated five tests approximately twenty-five times each.

Among the results obtained were the following:

1. Inter-correlations between tests increased as long as improvement in the functions continued.

2. Correction for attenuation did not do away with the increase.

3. The very best records in the entire series showed in spite of their presumable unreliability a relatively high inter-correlation.

4. The relation between improvement made by the same individual in different tests or at different periods in the same test was only such as might occur by chance.

The conclusion suggested by the first three facts is that where measures of ultimate capacity only are considered, inter-correlations are relatively high and individual differences seem to be increased.

Intelligence Irregularity as Measured by Scattering in the Binet Scale. J. E. W. WALLIN, Miami University.

[The abstract is omitted through an error arising in the Secretary's Office.]

How Is a Science of Social Psychology Possible? J. R. KANTOR, Indiana University.

Although it is becoming increasingly recognized that the data derived from the observation of group activities ought to be brought under scientific control and evaluation, psychology is today poorly equipped to handle such data. Why is it that psychology lacks the technique to interpret social behavior, whether of the single individual or of a number of individuals considered as a particular group? This deficiency is rooted in the physiological origin of current psychology, according to which psychological phenomena must be interpreted exclusively in terms of properties of biological organisms. This physiological psychology has failed utterly in its aims to interpret social phenomena, a failure which we may sum up in three hopeless results.

(1) Because psychologists were working with physiological materials they could not handle such responses as language, and the attitudes and thoughts marking off individuals of different groups. (2) Psychologists, not really finding any facts in physiological organisms by which to interpret complex reactions, have resorted to putative powers called instincts, which are nothing but names and not factors in social phenomena. (3) Again, because physiological conceptions are so fruitless for the description of social phenomena, psychologists have been forced to develop noxious conceptions of a universal superconsciousness or group mind.

In view of this situation it appears imperative to bring social psychology back to a concrete stimulus-response basis, for only on such a foundation may we hope to achieve a scientific interpretation of social phenomena. Accordingly, in our study of social behavior we find that just as in individual psychology we study the reactions of definite individuals to stimuli in the form of persons, objects, acts, events and conditions. With this difference, however, that in social behavior the stimulus objects are conventional in the sense that all the members of the same group have acquired common cultural reactions to them.

Behavior and Group Psychology. A. A. ROBACK, Northeastern College.

This paper deals with the question whether behaviorism can be applied in the social field of disciplines as a substitute for the psychology of the group in a mentalistic sense. Many recent writers on group phenomena make use of behavioristic terms with-

out really being aware of the issues between behaviorism and traditional psychology, and in consequence their terms are out of gear with the point of view they start from. *Prima facie* it would seem that it is more desirable to speak of crowd behavior than of a crowd consciousness, especially as a group cannot be said to possess an introspective consciousness. But a similar objection holds against the behavior approach, for it is impossible to tell what a crowd or in fact any group is doing at a given moment except in the roundest, hence unscientific, terms. The conception of a group mind does in fact unite the manifestations of a group under a unitary head, and in this way it affords a synthetic approach to a synthetic subject. The concept of group behavior, if treated in any significant sense of the word, can but give an analytic basis for our study, which, from the nature of the case, defeats its own end.

The suggestion to abandon the study of the group as such and to concentrate all the energy upon the observation of the individual as influenced by the group involves not only a circular mode of reasoning but is fatal to any collective psychology. Knowledge about the individual will give us no more information about the group than the knowledge of the properties of oxygen and hydrogen would acquaint us with the power and appearance of Niagara Falls.

Group psychology furthermore tries to reconstruct the Greek or Roman mind from the writings of representative Greeks and Romans and the traditions of the two nations as carried over from generation to generation. For the behaviorist, all that has been written by and about the Greeks comes down to innervations and contractions of certain muscles, and even that must be inferred, for in reality what he has before him is a series of marks occasioned by a number of agents, from the original writer down to the press-feeder. In what respect is the copyist's work to be regarded as inferior to the author's, since the action of the musculature is not essentially different in the two cases? The whole branch of collective psychology, and with it most of the social sciences, must fall with the acceptance of an orthodox behaviorism.

Are There Any Sensations? R. M. Ogden, Cornell University.

The question refers both to the existence and to the systematic utility of the so-called "element" of sensation. The difficulty of isolation makes the element less real to observation than other units of perception and a phenomenological analysis brings to light

attributive data rather than conscious entities. The suggestion is made, therefore, that a sensation can exist only as a percept, and that its analysis is made on the same level as that of any other percept. May we not, then, give up the attempt to list and enumerate sensations, and, likewise, their corresponding images? Instead, a program of investigation is favored which seeks to study the nature of the attributive aspects of consciousness and their primary and secondary integrations. Affection, too, may fall into this scheme, not as a conscious entity, but as an attribute of a higher order, attaching to definite integrations of those qualitative and quantitative attributes which constitute both the perceptual and the ideational types of experience.

Concerning the Sensation Quality (A Behavioristic Account). EDWARD C. TOLMAN, University of California.

A careful analysis seems to indicate that in addition to the immediate presence of the quality or *quale* itself the sensing of a sensation-quality also involves, or is at any rate accompanied by, a capacity or readiness on the part of the individual experiencing the quality to indicate the relations of similarity and difference of that quality to other qualities.

We may designate this capacity or readiness to indicate the relations of the given quality to other qualities—a readiness of the "term-character" of the quality *to function in behavior.* That is, by the term-character of the quality we will mean the latter in so far as it receives a purely formal definition in terms of its relations of similarity and difference with respect to other qualities.

Now our main thesis is that it is only the term-character of the quality which "gets across" either in introspection or in any other form of behavior. The subject's *quale* as such is never known to the observer. The method of procedure and the final results which get into our science are in essentials no different whether we ask a fellow human to introspect and describe his sensation-qualities or whether we try out a lower animal or a "man from Mars" in a Yerkes Discrimination Box. In either case the only thing that we finally learn—that we finally get into our science—is what standardized stimulus situations the given organism will treat as similar and what ones he will treat as different, and to what degrees they will be similar and to what degrees they will be different. The organism's *qualia* corresponding to these standardized stimulus situations we will never be certain of knowing—of having any

immediate acquaintance of. If what looks green to you looks the complementary red to me, I doubt if there would be any way of our ever discovering this fact.

In conclusion, then, I wish to urge the advantages of the behavioristic formulation. For whether our particular job concerns us primarily with introspection or primarily with the more gross forms of behavior, all that ever gets into our science is not the *qualia* as such, nor even ideas, awareness, and the knowing self, but merely the behavioristic implications of such entities.

The Functional Aspects of Structural Process. CHRISTIAN A. RUCKMICK, Wellesley College.

Almost a decade ago, when the author reviewed the variety of concepts that underlay the use of the term "function" in English textbooks of psychology, he promised later to treat the broader aspect of the problem of mental functions in systematic psychology. At the present time when fundamental concepts and methods are being discussed and delimited it seems not inopportune to offer a possible interpretation of the functional phases of mental processes.

There are three ways in which a mental process may function:

(1) *It may be an essential constituent of another more complex process.* When a perception is determined to consist of a group of sensations and images, the structural analysis ends with the enumeration of their qualitative and quantitative characterizations. The assignment of their degree of importance relative to each other is a functional aspect. Also in larger complexes we speak of the "rôle" of a process.

(2) *It may serve as a substitute for another process.* This refers to the phenomena of vicarious functioning as well as the replacement of processes in the abstract ideas of thought.

(3) *It may imply a reference to the mental life in part or as a whole.* In this group fall not only the processes that are regarded as serving a purpose for the mental life beyond their mere existence, such as attending, perceiving, remembering, imagining, etc., but also the reference that one group of processes bears to another as "context" or meaning.

It is important to review these concepts because, having forgotten or disregarded the earlier discussions raised by the structuralists, modern psychology has a tendency to discard that point of view entirely in favor of the supposedly newer psychology of dynamic force and biological purpose. In reality these issues are

old. The literature shows, indeed, that the strongest supporters of structural psychology have accepted the doctrine of mental functions as plausible and profitable, but have chosen experimentally to follow their own path in order to keep their view unobscured. In a systematic treatise or textbook, however, the description of the mental life is incomplete without the adoption of the functional point of view.

A Physiological-Genetic Theory of Feeling and Emotion. FLOYD H. ALLPORT, Harvard University.

Although our knowledge of the physiology of emotional states has advanced considerably in recent years, there has been little progress in combining physiological and psychological viewpoints. This paper aims at a synthesis of the contributions of James, Lange, Cannon, Watson, and others, and a re-interpretation of physiological data at hand. Specifically, the writer hopes to supplement the James-Lange theory in respect to the physiological differentia of fear, anger, and other states, and also to throw light upon the nature of feeling and its relation to emotions. An emotion is analyzable into (1) an experience either of pleasantness or unpleasantness, and (2) some quality which serves to differentiate it from other emotions having the same feeling tone. Anger, for example, is introspectively different from fear or other unpleasant states. In the autonomic nervous system we have a mechanism logically suited to the antagonistic nature (pleasantness vs. unpleasantness) of the first-mentioned content. The cranio-sacral division, together with the cerebro-spinal, of which it is really a part, innervates movements whose return sensations constitute the feeling of *pleasantness*. The sympathetic division, in opposition to the cranio-sacral, functions in *unpleasant* experiences.

Evidence for this view is derived from a consideration of the rôle of the sympathetic division in unpleasant emotions (fear, anger, pain, etc.), and that of the other division in the pleasantly toned food and sex activities. Further evidence is at hand from the relative latent periods of these two classes of experience, and from careful introspective reports concerning their localization and temporal aspects.

The differentiation of emotions within one affective group is accounted for by the difference of facial, skeletal, and other postures characteristic of the different responses, and added by cerebro-spinal innervation to the sympathetic core of feeling. Evidence

for the elementary dichotomy on the basis of affection, with subsequent development of the differentiated emotions, is present in the infant. The earliest emotive state (protopathic) is probably pure "feeling." Indications of emotion first appear with the use of the prepotent somatic reflexes of defense and avoidance.

The conditions controlling the arousal of an unpleasant emotional experience are strength, suddenness, and insistence of the stimulus, the blocking of the somatic response, and the state of visceral preparation.

The theory proposed is supplementary rather than antagonistic to central theories. The facts of behavior however necessitate a peripheral differentiation as a necessary element in the total emotional event.

A Concept of Compensation. E. S. Robinson, University of Chicago.

Compensatory behavior can be defined in a very general way as a type of activity which grows out of conflicting and mutually modifying impulses. These impulses are tendencies toward action and, as such, vary from mere undetected dispositions toward action to dispositions which have got out into anything short of complete, unmodified expression. Such impulses enter into conflicts which result in the effectual inhibition of action in all but one direction, in emotion, in thinking, in some form of dissociation, and in compensation, or in some combination of two or more of these. Compensatory behavior is thus one form of conflict resolution.

In any particular compensatory act the nature of the conflict which that act resolves may or may not be evident on the face of the act itself. Since a multiplicity of receptors guarantees a constant conflict it might be claimed that all acts are to some degree compensatory. This is true just as it is true that all acts are to some degree rational, perceptual, *et cetera.* It will be useful to emphasize the compensatory aspect of only those acts which are most evidently the result of conflicting and mutually modifying tendencies.

Correlations of Four Intelligence Tests with the Grades of Students and with Each Other. A. M. Jordan, University of Arkansas.

Purpose of the Investigation:

(*a*) To find out the test or the elements of the test which furnishes the best prognosis of the standing of pupils of the high school in their subjects of instruction.

(*b*) To investigate the effect of time on the correlations.

(*c*) To discover by means of the regression equation the weights to be attached to the score in each test in order to obtain the optimum correlation.

Method:

A. Four intelligence tests—Army Alpha, Terman, Otis, Miller—were given to seventy high-school students.

B. Army Alpha was given to 315 university students.

C. Correlations with probable errors were computed between: (1) Each of the four tests and the subjects of instruction taken together. The value of each subject being determined by grade points. (2) Each of the tests and English, science, mathematics, and history individually. (3) Each of the elements of each test (31 elements in all) and (*a*) total subjects, (*b*) science, (*c*) English, (*d*) history, (*e*) mathematics, (*b*), (*d*), and (*e*) were not completed.

D. Correlations were made between Army Alpha and the subjects of instruction in the University for a period of two years (only one completed).

E. The computation of regression equations with at least four variables in the case of the highest correlations of the elements of each test and with the total tests (not completed).

Conclusions:

A. For general prognosis Terman has the highest correlation, .492; for history, Terman, .356; for science, Terman, .508; for English, Miller, .428; for mathematics, Army, .371.

B. Among the elements of each test there are considerable variations in the coefficients of correlations with the various subjects of instructions and with each one. Those elements having the highest correlations with the average of grades are: Terman—1, .555; Army—5, .514; Terman—7, .492; Otis—5, .479; Miller—1, .466.

C. With English the following elements correlate highest: Miller—1, .594; Terman—3, .572. Therefore elements that require less than ten minutes to give and a little while to score give as good a prognosis of the pupils' standing in English as the whole test.

D. Otis—5 gives a correlation of .67 with mathematics.

E. There is a general reduction of the size of the coefficient of correlation during the three terms of the first year in the case of Army Alpha and the grades of the University students.

The Correlation of Performances in the Pencil Maze and on the Otis Examination. W. S. HUNTER, University of Kansas.

The present study is a part of an intensive examination of maze habits with particular reference to their value as indicators of learning capacity. So far in this laboratory, experiments have indicated that the rat's performances in the maze are so variable and inconsistent that the records fail to show the presence of any such factor as a "learning capacity" which might be influenced by such factors as sex, age, drugs, etc. (This work was begun by D. G. Paterson and continued with rats in great detail by Oaklan Maupin, W. T. Heron and W. S. Hunter.)

Forty-three elementary psychology students were given the Otis intelligence examination and were also required to master a difficult pencil maze. Pearson coefficients were calculated, indicating that the higher the Otis score the less total time, trials and errors were involved in the maze learning (correlations of .45, .17, and .34 respectively—P.E. .012). The correlations for surplus time and errors with the Otis were the same as those just given. The correlation of Otis score and total time required to form the maze habit is as high as the correlations of the Porteus maze with the Army Alpha and compares well with the correlation of Otis and school marks. I am not urging the use of the pencil maze habit as a component of some intelligence test scale. What I am interested to show is that there is a common factor in the Otis test and the formation of a pencil maze habit. To a certain degree, it is possible to predict from performance in one problem to performance in the other. The inconsistency found in the rat data mentioned above is not due therefore to the fact that the maze cannot reveal a stable factor in the subject, for this can be done with humans. Nor do those results with rats necessarily show that the methods used on those animals are wrong. This is possible, but it is hard to see how the standard methods can be changed for the better. What the work is apparently indicating is the existence of a species difference of *stability of performance* between man and rats.

Effects of Loss of Sleep. FLORENCE RICHARDSON ROBINSON, University of Chicago.

In order to test the effects of loss of sleep upon such abilities as are involved in the taking of tests, twenty-five students volunteered to stay up all night and to go without sleep during the forenoon following. They were given forms of the Army Alpha the

day before and the two days following the insomnia. There was little difference in the scores of this group and those of a group of thirty-nine students used as a control. There were marked differences, however, in the reports of the degree of tiredness and of the amount of effort expended in taking the tests.

As a one-night insomnia did not noticeably affect the test records, three students remained awake on two successive nights with no sleep on the day intervening. They had previously been given a daily practice of approximately three weeks upon several motor and mental tests, as follows: aiming, hand dynamometer with right and left hands, spelling backward from copy, tapping, and mental multiplication of two-place by two-place numbers. The test records during the period of insomnia and for four or five days afterward showed no significant loss of efficiency nor any fatigue spurt such as those described by May Smith. Although the findings of the test were negative, the subjects' reports indicate unusual mental and physical conditions immediately after the loss of sleep. These disappeared by the second day after the insomnia, and the tests were discontinued upon the fifth day after.

The results indicate (1) that test scores do not here reveal a loss of efficiency; (2) that introspective reports at the same time show changes, particularly in the necessity of making greater effort; and (3) that the loss of efficiency in the tests due to insomnia was not more than the gain due to the interest in the test records.

Determination of Fatigue Effects by Blood Sugar Tests. BUFORD JOHNSON, The Johns Hopkins University.

The investigation reported was undertaken in a study of individual variability among school children in susceptibility to fatigue. A preliminary study was made with certain of the tests used in order to determine the value of such in a study of fatigue, and also to eliminate practice effects.

Eleven children, chosen by the physician as probable cases easily fatigued, were used as subjects. The age-range was six years, eight months, to eleven years. Two blood sugar determinations were made for the purpose of establishing a normal for each child. The first series of tests given involved muscular activities. The tests included were: tapping (alternate board); tapping (single board); dynamometer and target. Third and fourth blood specimens were obtained immediately before and after the tests were given. The variations in amount of sugar found for three of the

children were such that an additional group of muscular tests was given two months later. The second series of tests included those which are usually assumed to measure the higher mental processes or intellectual activities. They included the memory span for digits; tactual discrimination; symbol substitution; and motor coördination. In this series also blood specimens were obtained immediately before and after the testing. The tests were given individually. A specimen of urine was obtained after the last series.

The Analysis of Reading into its Constituent Elements. ARTHUR I. GATES, Teachers College, Columbia University.

About 100 school children, some of them decidedly backward in reading and spelling, were given a large number of tests, both individual and group, designed to measure activities involved in reading. In addition to the special tests, the Stanford-Binet, a number of verbal and non-verbal group intelligence tests, about a dozen standard reading tests, and tests of spelling, arithmetic and writing were given.

The purpose of the study was twofold: (1) to devise a series of tests, convenient to administer, for the diagnosis of backwardness or disability in reading and spelling and (2) to secure information concerning the constitution of the two functions.

The results show reading to be an integration of a large number of activities, many of which may be inappropriately developed as a result of too much or too little of certain types of instruction or inhibited through visual and other organic defects. It is frequently possible to single out the ineffective reaction which may be developed through specific exercise with a rapid improvement in the function as a whole, as the result.

Comparison of White and Negro Children in Multiple Choice Learning. JOSEPH PETERSON, Peabody College.

In view of differences that have been found between negro and white subjects with the standard intelligence tests, drawing more or less on information supposed to have been acquired under equality of opportunity, it seems worth while to make comparisons based on some learning processes as independent of experience as possible. A learning process that involves important higher functions and that affords a high degree of objectivity in method and results is desirable.

In the present study the Rational Learning test was used. The first five letters of the alphabet were numbered in the random

order A, 4; B, 2; C, 5; D, 1; E, 3; and the problem was to find and learn the numbers of the several letters. The letters are called out in order and the subject at first guesses, but may later limit the range of pure guess work. Every response is recorded in order and a complete objective record is kept. The method is published in *Psychol. Rev.*, 1918, *25*, 443 *ff.* and *J. Applied Psychol.*, 1920, *4*, 250 *ff.*, but instructions were simplified here.

In all, 616 children were tested individually, 301 white and 315 negro. They were selected by age from seven Nashville schools. The distribution by age and race of 586 of them is given below. Of the others, 3 negro children cried and were excused; 14 eight-year-old negroes could not even solve the problem with three letters; 13 (7 W and 6 N) had been coached. These are not classified in the results, though the 14 failing to learn should be counted with those taking over 40 minutes, the limit of time allowed for any test.

The results may be indicated briefly thus: In "time" 100 per cent. of the 18 seven-year-old whites surpass the median of the 7 negroes of same age; 99.5 per cent. of the 108 eight-year-old whites surpass the median of the 127 negroes of eight years; 94 per cent. of the 84 nine-year-old whites are above the median of the 97 negroes, same age; 95.7 per cent. of the 84 ten-year-old whites surpass the median of the 62 ten-year-old negroes. In "number of repetitions" the per cent. of whites surpassing the negroes of equal age are 83.6, 85.4, and 77.7, respectively, for the oldest groups. Only one seven-year-old negro completed the learning. As regards "errors" the corresponding percentages are 90.5, 89.2 and 90. The percentage elimination of errors also shows marked superiority of the white children.

This research was aided by a grant from the American Association for the Advancement of Science.

Experimental Study of the Development of General Versus Particular Habits in a Learning Process. J. F. DASHIELL, University of North Carolina.

Psychological analyses of behavior seem to be widening from earlier efforts at determining exactly what particular specific elements are involved (*e.g.*, what specific stimulus-response bonds) to include efforts at determining also the more general processes and factors present. Some recognition of the more general factors has been shown in the conception of the acquisition of skill as a

process of erecting hierarchies of habits, in the conception of transfer of training as involving identities of procedure, and in the conception of learning as a process of refinement from gross adjustments to finer ones.

The present study was an attempt at the experimental separation of certain general and special adjustments in the process of development. The substitution type of test was used, involving the substitution of letters for numbers. Three arrangements were adopted, using three groups of adult subjects. One group was given one identical code for all trials; another group a new code for each day's trial; a third group a code half of which was identical with the preceding day's code, half of it new. The first and second tasks differed in that while the first was the problem of learning a set of specific reactions to specific stimuli plus more general adjustments to the more general elements, the second involved improvement in the long run only of the more general adjustments. Results show a superiority in the rate of learning of the first task. The task set the third group of subjects being that of using successively a series of similar-dissimilar habits was designed to provide interferences between the habits. The rate of learning here was inferior to that for the first group using the identical code throughout and also inferior to that of the second group using the ever-changing codes.

A Mirror Pencil Maze. JOHN E. ANDERSON, Yale University.

A pencil maze through which the subject guides a stylus by observation in a mirror is described. It may be used as a substitute for the more common star tracing experiment and gives quite as satisfactory results. The present experiments were made on 90 male college students, each being given 20 trials with the maze in the 0° position followed by 10 trials in each of the 90°, 180° and 270° positions and 10 trials with the maze in the original 0° position without the mirror. Time was taken with a stop watch, no record being made of errors which however affect the time decidedly since they usually involve retracing of the path.

The results are as follows:

a. Very good learning curves are obtained which show all the typical features of learning curves obtained in longer and more complicated experiments.

b. Rotation of the maze through the various positions causes the curve for the next 10 trials to start at a higher level, illustrating

the effect of a change in some of the factors of the situation. Learning, however, continues through all the trials in spite of the shifts.

c. The correlation coefficients between average speed on the first 5 trials and that on the last 5 trials in the 0° position, between average speed in the 0° position and that in the rotated positions, and between average speed in either the 0° position or rotated positions and that without the mirror, are high.

d. The correlation coefficients between ability to read mirror script and ability to handle the maze in any position are zero or small and negative.

e. The correlation coefficients between ability to handle the maze in any position, ease of making the shift from one position to another, gain from first to last trials and other measures of success on the maze and intelligence test scores (Army Alpha) are low, approximating zero. Similar coefficients between the various measures of success with the maze and scholastic standing are low and negative, but uniformly higher than those with intelligence test scores.

A New Differential Color Mixer and Its Applicability. E. B. TWITMYER and S. W. FERNBERGER, University of Pennsylvania.

The apparatus is constructed with a double shaft,—one inside the other. The outer shaft is attached to one color and to one of the pillars; the inner shaft is attached to the other color and to the other pillar. A spiral groove is cut in the outer shaft, in which engages a pin attached to the inner shaft. In this way the relation between the two shafts, and thus the relative amounts of color in the mixture, may be changed rapidly while the apparatus is revolving. Outer shafts are supplied with grooves of different pitches, —one for moving the colors through 100 *per cent.* for demonstration purposes; the other for moving the colors through 50 *per cent.* (and therefore with the possibility of finer gradations) for purposes of research. A direct reading scale indicates the relative position of the colors.

Preliminary experiments with this apparatus for obtaining the difference-limen for greys indicate its usefulness for the procedures either of the haphazard arrangement of the method of just perceptible differences or of the method of constant stimuli. It is possible to obtain 350 judgments,—50 judgments on each of seven pairs of stimuli,—in about three hours' time. The curves thus obtained are relatively of the form of the *phi gamma* hypothesis.

A New Type of Color-Mixer. PAUL THOMAS YOUNG, University of Illinois.

Stationary color discs may be mixed by means of rotating mirrors. Several types of rotating mirror have been tested and two, especially, have proved satisfactory: (1) Parallel mirrors rotated between the eye and the discs about an axis from the eye to the center of the discs. (2) A single plane mirror, set firmly at an angle to the axis of rotation, arranged so that the stationary discs may be seen in reflection.

Color surfaces for use with the new style color mixer must be arranged in special double-sectored discs in order to give a uniform color field. Other arrangements of color surfaces yield interesting results.

Stationary discs have several advantages over rotating discs. Continuous changes of color and light may be made easily and with an indefinite number of discs. Adjustment of the apparatus is simple and economical of time.

An Illuminated Perimeter with Campimeter Features. GERTRUDE RAND, Bryn Mawr College.

This instrument was devised in response to a request by the American Ophthalmological Society for a feasible means of illuminating the perimeter arm with light of a good intensity and quality, so that every point on the arm in any meridian in which it may be placed shall receive equal intensities of light. Intensity and quality of illumination are, however, only two of the factors which influence the results of the perimetric determination. In devising the instrument to be described in this paper it has been our purpose to provide a control also of other factors which are of importance to the work of the office and clinic.

By a sufficiently wide variation of intensity alone the fields of color sensitivity may be made to have almost any breadth within the field of vision, to differ radically in shape and even to change or reverse their order of ranking as to breadth. The limits for pigment stimuli may be either interlacing or concentric in the order from widest to narrowest of red, blue and green; or of blue, red and green, depending upon the intensity of light falling on the perimeter arm. Without great precision in the control of intensity it is obvious that reproducibility of result can not be obtained and little significance can be attached to extent or shape of field, to order of ranking as to breadth of field, or to any variations from time to time or from person to person in these important features.

Other special features of the instrument are a carefully standardized control of brightness of preëxposure and surrounding field; a provision for an accurate control of fixation both for the normal eye and for the eye having a central scotoma; a device for the mapping of a central scotoma; a tangent screen for the mapping of the blind spot and paracentral and peripheral scotomata, which can be readily attached and removed from the stimulus carriage; etc.

The Effect of Variations of Intensity and Composition of Light and Size of Visual Angle on Functions of Importance to the Working Eye. C. E. FERREE, Bryn Mawr College.

The benefit of increase of intensity of illumination is shown for the following functions of importance to the working eye:—acuity, power to sustain acuity, speed of discrimination and speed of adjustment of the eye for clear seeing at different distances. Wide ranges of change of illumination were used. The effect was measured both on normal eyes and eyes with slight errors in refraction of a type and amount of frequent occurrence in the corrected eye. The benefit of the increase was found to be considerably greater in case of these slight defects than for the normal eye. A comparison is made of the effect of increase of intensity of illumination and increase in size of visual angle. The question of the most favorable intensity of illumination of test charts for different test purposes is discussed. The importance of testing the neglected aspects of acuity: speed and power to sustain, in relation to diagnosis, vocational selection, and hygiene or welfare work on the eye is demonstrated. A comparison is made of the sensitivity of acuity, speed of discrimination, speed of adjustment of the eye for clear seeing at different distances, and power to sustain acuity, as test features for picking up small differences in the functional power of the eye.

The investigation is also extended to include the effect of variations in the composition of light on acuity, power to sustain acuity, and speed of discrimination. Two intensities of light at seven points in the spectrum were used. The relative importance of resolving power of the refracting media and resolving power of the retina is discussed in relation to the effect of changes in composition of light on acuity, speed of discrimination and power to sustain acuity.

Practical Logic and Color Theories. CHRISTINE LADD-FRANKLIN, Columbia University.

The psychologists, when they discuss reasoning at all (and some of them hardly give it passing mention), take the ground that the

kind of reasoning that interests them is something very different from the cut and dried formulas of the logician. The reason for this quarrel between two honorable branches of science is simply, of course, that the psychologist has the inveterate habit of including in his term reasoning the search for what I have called the "adequate" premises—what is half the battle, of course, when one is engaged in thinking out a solution to real difficulties. The pure logician, on the other hand, cares nothing for this aspect of the matter—he is concerned only with the validity of structures of premises. I propose to use the term *practical logic*, in a technical sense, for the psychologist's logic, and to call that of the logician theoretical logic, or pure logic. This simple device of giving two names to two different things ought to have the effect of modifying the contemptuous terms in which the psychologists sometimes discuss the logicians.

I must first urge the adoption of certain reforms in color terminology which I have long been advocating and which are indispensable to a thoroughgoing discussion of this subject,—namely, *chroma* and *achroma* for the two kinds of sensation which the word color now covers ambiguously; chromaticity and achromaticity for the *degree* in which these two types of sensation are present in a complex color experience; and other equally useful changes.

Why should not the scientist, whose constant occupation is practical reasoning, devote some time, now and then, to polishing up the tools of his trade? Why should he not make a special study, when occasion offers, of the great quagmires of bad reasoning that, in various fields, lie behind him? And it is exactly the psychologist who will have the best material for this study. It is safe to say that there has never been a subject of scientific research that has offered such a good field for studies of this kind as does the subject of color. Both the old theories and the new—both the current theories and the non-current—are rich in not only common errors of logic but far more, of course, in sins against the fundamental principles (axioms, as G. E. Müller calls them) of the neuro-psychic correlation. And it is the mistaken theories of color which have high pedagogical value in sharpening up the wits of the intending reasoners.

Psychology in Relation to Social Work. RICHARD C. CABOT, Harvard University.

[No abstract.]

The Biology of Sanity. STEWART PATON, Princeton University.

1. Sanity and Insanity, like words health and disease, are relative terms requiring constant revision.

2. Useful occasionally to try and describe these conditions as this gives indication of character of methods used in the investigation of vital phenomena.

3. Unfortunately, value of synthetic methods not appreciated to same extent as value of analytical methods in the study of the personality.

4. Important for practical as well as theoretical reasons that both methods should be used.

5. Importance of both methods, illustrated by case records.

6. In order to understand conditions described as "sanity," we have to consider organization of the body as well as mind.

7. Organization of the *sound* body: (a) Provision for drainage of energy manufactured in well-coördinated movements. (b) Energy liberated to meet critical situations adequate, but not in excess, of that which occasion demands. (c) Proper adaptation of instinctive activities. (d) Satisfactory compensatory processes for existing physical defects. (e) An efficient executive department.

8. Organization of the *sound* mind. (a) Extends range of adaptability by supplementing physical organization. (b) Supplies sense of completeness and accomplishment. (c) Appreciation that "activity is the cardinal fact of life." (d) Recognizes life as a process and not a state of adjustment. (e) Coördination of activities does not interfere with illative capacity. (f) Well-organized judicial department.

9. Accurate observation of efforts made to adjust life are often of more scientific importance than the data obtained by any of the artificial systems devised for testing intelligence.

10. Results of "Intelligence-Tests" should always be checked up by comparison with actual life experiences.

Psychology and Psychiatry. SHEPHERD IVORY FRANZ. St. Elizabeth's Hospital, Washington, D. C.

Perhaps the greatest difficulty in the relations between psychology and psychiatry is the relative ignorance of psychologists and psychiatrists of the methods and facts of the other discipline. Another is the fact that both have frequently identified psychiatry or psychology with the work of some single man—and usually one with whom they disagree emphatically. The two borderline fields

are abnormal psychology, to be understood in terms of the distribution curve as mere deviations from the usual, and pathological psychology or psychopathology, which stresses the pathological character of certain of these deviations.

Psychiatry as an art or an application of science, looking towards the cure of those mentally diseased, must consider several underlying sciences, among them psychology. Hence your individual psychiatrist should devote time for mastering some of the methods and facts of psychology as he does in acquiring those of chemistry, pathology, physiology or any of the other fundamental medical sciences. This he has not considered necessary up to the present time. Few psychiatrists can, at present, read a technical psychological journal with understanding. Such an education in psychology need not be required for the psychiatrist but, in that case, we must develop men in the borderline sciences of abnormal psychology and psychopathology who will translate the work of the technical or professional psychologist into language understandable to him. The development of such borderline sciences conforms to the general history of the development of medicine, such as the specialized bio-chemist who takes the facts of general chemistry and makes them available, by means of research determining their applicability, to the diagnosis and treatment of disease.

Another specific criticism by the psychiatrist is that, up to now, psychology has only been a science of analysis with little regard for the interrelations of the parts analyzed and described. In a sense this is true, but psychology is becoming more and more dynamic. But even if psychology should become entirely functional, there is no reason to assume that the facts or explanations can be carried over bodily into psychiatry. There must develop, in the same way as between anatomy and medical practice, close connecting lines. And in this sense abnormal psychology and psychopathology are the psychological-psychiatric intermediaries.

What Can Psychology Contribute to our Knowledge of the Mechanisms of Mental Disorder? C. MacFie Campbell, Boston Psychopathic Hospital.

The physician dealing with cases of mental disorder seeks an explanation in the principles which he has acquired in the various disciplines which are preparatory to his clinical work. He seeks to understand the disordered action of the heart, according to the principles which he has learned in physiology, biochemistry, bacteri-

ology and pathology. In dealing with the more complex disorders which involve the reaction of the individual to the environment, he naturally adopts the same attitude. In some cases he finds the clue to the disorder in structural and toxic damage to the central nervous system, and deals with the situation according to the general principles of internal medicine. In other cases, however, he finds no such clue. There may be no symptom or condition upon which internal medicine throws any light. The central nervous system seems to be structurally intact, and the physician has to formulate the disorder, not in the simple terms of organs and tissues or pathological processes, but in more complex terms in psychological terms. He has to describe the patient as having morbid beliefs and suffering from abnormal moods and attitudes. In relation to such conditions one naturally turns to psychology to find what light it throws on these factors, just as in clinical disorders of the heart one turns to physiology to help one to study the regulating mechanism of the heart. One appeals to psychology to give one data with regard to the principles underlying the genesis of belief and concerning the conditions which regulate the affective aspect of our life. From the clinical standpoint the affective aspect often of the patients' life seems of central importance. It is, therefore, to the chapters on feeling and on the affective life in the psychological text-books that the physician turns for some assistance. One would hesitate to look to the psychological laboratory for much insight into these problems, for one naturally suspects laboratory emotions; there are some life situations which do not lend themselves to experimental investigations. The psychologists who are interested in studying behavior without utilizing the ordinary data gained by introspection, as a rule, study the cruder emotional reactions, and give us useful information in regard to them. The patients whom the physician has to study may, however, not be suffering from symptoms which are easily referable to these cruder emotions. Their affective life may be very much more subtle than can be expressed in such terms. They tell of their morbid beliefs and attitudes, and the physician does not feel entitled to discard these important clinical data on the ground that they are tainted with introspection or on any other epistemological basis. A brief record of a patient complaining of depression will be given, and the members of the Association will be invited to discuss how far such a familiar reaction as depression is adequately dealt with in modern psychology.

Three Factors Associated with Success in Educational Leadership. LAURA MERRILL CHASSELL, Ohio State University.

The study reported here is a part of a research having as its problem the ascertaining of the qualities associated with success in educational leadership. The purpose of the investigation was to determine, for a professional institution, which data in regard to its Ph.D. candidates indicate most satisfactorily the success which these individuals will subsequently achieve. Among the data examined were standing in the preliminary examinations, merit of the doctor's dissertation, and letters of recommendation.

The group of educational leaders chosen as the subjects of the study included all persons who had received the degree of doctor of philosophy in education from Columbia University during the years 1898 to 1915. The criteria of success were ratings of these individuals by members of the staff of Teachers College in respect to the following traits: character, general ability, intelligence, success as scholar-investigator-author, and success as teacher-supervisor-administrator. The ratings in each of these traits served as independent criteria with which factors were correlated. In addition, a combination of the ratings in the two success traits was also used.

The quantitative measures used to represent the three factors were secured, respectively, from the grades in the preliminary examinations, from ratings assigned by members of the staff of Teachers College to the doctor's dissertations, and from the judgments of educators who read the letters of recommendation from the standpoint of the promise which the letters indicated of success in the educational field.

The first two factors were correlated with each of the criteria, including the composite; and the third, with the trait success as teacher-supervisor-administrator, the letters being divided into nine series on the basis of authorship, which were separately correlated.

The correlations obtained for the first factor range from .46 to .63, having a median of .59; for the second, from .27 to .83, having a median of .585; and for the third, from .01 to .74, having a median of .30. The central tendency of the first two factors is thus practically the same. There is, however, very decided difference in the variability. Letters of recommendation are even more variable, their value differing markedly from series to series. The central tendency is so low that reliance upon a letter of recommendation is hazardous unless the author's reliability is known.

A Quantitative Investigation of Study. A. S. EDWARDS, University of Georgia.

Investigation of problems of study includes, among other things, (1) a quantitative study of students' knowledge about how to study from the second grade through the university; (2) the effect on scholarship as shown by teachers' grades of teaching certain facts about how to study. A tabulation of nearly 8,000 facts suggests general principles of study and principles that apply to the following special types of studying in the order of frequency mentioned: reading type, mathematical, spelling, composition, foreign languages, manual-motor type, and study of objects and experiments. Most study appears to be of the reading type; about half of one per cent. of the statements indicated the observational type. Students untrained in how to study seem to know very little about it; college freshmen give fewer facts than high-school freshmen. The method of "counting facts" is considered; Garth's scale is discussed; the measurement of knowledge about how to study must be distinguished from the measurement of achievement in study. Scales should probably be made for each type of study; no one scale is adequate. There is slight positive correlation between scores for knowledge about how to study and scores for intelligence as measured by the Haggerty and Otis tests. Teaching certain facts about how to study under experimental conditions makes improvement in teachers' grades. The investigation emphasizes the necessity for studying a given problem, not at a given mental age and then making inferences for other ages, but at all mental ages. A graded selection of facts about how to study for each grade from the second to the eighth has been successfully taught to practise school children in the Athens State Normal School.

The Relation Between Mental and Physical Growth (Based on Consecutive Measurements of Individuals). BIRD T. BALDWIN, University of Iowa.

The development and practical applications of an experimental science may be measured by the degree to which prediction is possible.

1. The scientific prediction of physical and mental growth enables one to determine whether children are advancing at a normal rate. Remedial measures may be taken to accelerate growth or prevent over-stimulation. The significance of any increment of growth, physical or mental, depends on what the status at later

periods should be, the size of the increment being conditioned by the physical or mental type of the individual. Tall, medium, and short children grow differently with characteristic physiological stages of maturation which later affect the rate and completion of growth. The evenness of physical growth is shown by the fact that coefficients of correlation, for growth in height for boys and girls at 6 or 9 years of age and six years later, range from +.718 to +.921. For mental development the correlation between the first and fifth I.Q. is +.84.

It is possible to predict the stature of children at 15 or 16 years of age from their stature six years earlier with a P.E. of estimate of 2.08 centimeters for boys, and 2.81 centimeters for girls. The I.Q. can be predicted somewhat less accurately with a P.E. of estimate of 6.3 points for a fifth examination.

2. The mean mental growth curves are strikingly similar to the physical growth curves in height with an adolescent acceleration which appears earlier for girls than for boys, and earlier for superior children than for average children. The curves for average and superior children diverge at the higher ages.

3. The bi-dimensional mental growth scales (chronological age and intelligence) do not take into consideration a third dimension or physiological age which is highly correlated with successive stages of mental maturation from birth to maturity. Children of the different mental ages show a marked overlapping of mental abilities.

The correlations between growth in height and mental age ratings for both boys and girls are high.

Mean school-progress curves show that physiologically accelerated children are also pedagogically accelerated.

Mean mental-age curves of physiologically accelerated groups are uniformly higher.

The Present Mental Attitude of the American Labor Leader. ELIOTT FROST, Rochester Chamber of Commerce.

There are certain English phrases in common use by labor leaders whose emphatic repetition tends to mislead the public into a conviction of their importance. As a matter of fact, their implications are important only if true, and for the most part they are not true. Phrases such as "the average American family of 5"; "maintaining an American standard of living"; "the minimum decency level," and "the deflation of labor" imply facts which do not exist.

Industrial disarmament can occur only when and if management and labor alike are both fair and intelligent. Labor leadership in America at present is more militant than informed, and this misleadership is now retarding industrial peace.

A brief analysis of each phrase quoted proves that it is specious and by its reiteration postpones the day when Management and Labor, having a common purpose, as they have a common interest, can sit at a common council table to discuss methods for achieving their common goal.

The proper subject matters for such mutual discussion are wages, hours, continuity of employment, employee representation in management, and the distribution of profits; but these questions of method can never be taken from the battle-field and into the Council until we can change the present mental attitude of labor. This can be accomplished only when American industry grants to Labor its major premise—the right to organize; and in turn insists upon the minor premise—that it organize right.

A Study of the Output of Hand Compositors under a Particular Wage Incentive. HARRY D. KITSON, Indiana University.

Instead of discussing incentives for industrial workers in vague general terms, scientific procedure demands an incursion into the factory; an exact determination of the nature of the incentives, and a portrayal of their results in quantitative terms. Even then incentives are found to operate in complex situations, in which the various elements must be reckoned with and quantified.

This investigation, carried on in a factory where favorable conditions were in effect, was made in order to furnish such measurements. The wage incentive was a bonus paid after the worker reached a certain point in output; the amount of the bonus increased as the output increased. Measures were taken of the output of forty experienced hand compositors during the opening period of their employment in the plant. All had worked at the trade before entering the employ of this establishment, having had on the average ten years' experience. Weekly records of output were kept during the first five months of each man's service, and every three months' period thereafter until the present time; the length of time covered by measurement totaled as much as three years in the case of certain workers.

Results show that the workers increased their output markedly —sixty-seven per cent.—under the conditions prevailing at the

plant. They reached the point of bonus payment, on the average, at the end of the fourth week, and the point of maximum output at the end of the twentieth week. Thereafter they diminished their output slightly to a point where it remained stationary.

Statistical analysis of the records reveals the presence of two kinds of workers; and a scrutiny of their individual records throws light upon several matters of practical importance to industrial management and to theoretical psychology:

1. Discovery of a point at which this wage incentive failed to evoke further output.

2. An apparent example of "stereotyping of output" in peculiar group formations.

3. The half of the workers with less experience reached a volume of output greater than that of the more experienced half, suggesting that the increase in efficiency came not simply through the exertion of greater effort of will but through the elimination of wasteful movements and the acquisition of more economical methods of work.

4. This suggests that the spokesmen of labor are not justified in asserting that systems of bonus payment bring about high production only by forcing the worker to exert himself unduly.

Selecting Salesmen. C. S. Yoakum, Carnegie Institute of Technology.

Members of the Life Insurance School spend three months doing a specified amount of soliciting per day for a certain number of days during this period. They are supervised regularly in groups by an expert solicitor who is in charge of this practice selling. The first week of each school, a series of psychological tests, personal information blanks, etc., is filled out by each student. Each student must sell a minimum specified amount of insurance, in addition to passing his courses, to obtain the certificate of graduation. The tests included an intelligence test, the Downey will-temperament test in group form, a social relations test, objections to purchase test, interest analysis blank and a personal history blank.

The separate items of the blanks were weighed against the success or failure of students in Group A. The significance of total test scores for each form of test was found by using three-variable scatter tables. Success of prediction was based on total scores of a second group, Group B, compared to their success or failure. Group A contained 48 students. Group B had 75 stu-

dents. The table of values to be assigned for composite scores showed that certain items of the will-temperament test, the interest analysis, the personal history record and the objections to purchase test were most frequently found in significant relationships to success in selling. An intelligence or mental alertness test has no important predictive value beyond setting a minimum for those who can obtain passing grades in courses.

Students selling two cases or less with production below $5,000 were rated unsuccessful. Students selling two cases with a production more than $5,000 were rated doubtful. Students selling three or more cases with still higher production were rated successful in three grades, fair, high and highest success. Forty-six students received composite scores from 3 to 22; all were successful. Eight scored from 0 to 2. Of these, 25 per cent. were successful. Twenty-one scored from − 15 to − 1. Of these 2 or 4 per cent. were fairly successful but failed in class work. Dr. M. J. Ream had charge of the experimental work of this report.

Psychology, Psychiatry; Psychologist, Psychiatrist. WILLIAM HEALY, Judge Baker Foundation.

Discussion of the overlapping fields of psychiatry and psychology and of some needs for appreciations of factual material and points of view,—such appreciations being especially calculated to mitigate certain misunderstandings and acerbities arising during recent developments in the practical applications of mental science. The larger possibilities in complementary studies.

A Case of Double Personality. HENRY H. GODDARD, Bureau of Juvenile Research.

A nineteen-year-old girl who was about completing the first year of high school, when compelled to quit on account of ill health, falls at the most unexpected times and places into deep somnambulism; sleeps anywhere from a few minutes to some hours during which she is often violent and has to be restrained from running wild, and even when lying reasonably quiet gives evidence of very disturbing dreams, finally awakens and says that she is Polly, four years old.

She tests on the Binet scale a little less than four. This personality alternates with the normal in varying proportions. Through a modified form of automatic writing and suggestion, Polly has been educated and developed until she became first fifteen years

and then nineteen years old. But even at this age Polly is as wild and unrestrained and crude as the normal self is quiet and refined.

The methods employed for her rehabilitation have been re-education, hypnotic suggestion and psycho-analysis. The result to date includes almost complete elimination of the falling habit, comparatively quiet sleep and a great predominance of the normal personality.

Conclusion: Discussion of possible theories of the secondary personalities and criticism of the method used and results obtained.

The Etiology of Phobias. English Bagby, Yale University.

The writer presents a history of the development and cure of two phobias which he has recently investigated. A close analysis shows that both cases have certain elements in common with the claustrophobia described by Rivers in his "Instinct and The Unconscious." The following features, common to the three cases, are taken to be significant.

1. The disturbance dates from a traumatic episode to which the patient reacted with intense fear.

2. The episode involves some forbidden action on the part of the patient which prevents discussion of the experience with parents or others who might give reassurance.

3. Memory of the episode is almost completely repressed, but recall, when it occurs, brings about the disappearance of the symptoms.

The writer suggests that all true phobias are marked by the features just described. However, it is necessary to avoid confusing phobias with simple conditioned fear reactions. The latter tend to lose much of their intensity with lapse of time.

The view just outlined is contrasted with the Freudian conception, according to which the fear present in phobias is transformed libido, or sex-energy, which has become attached to an external object. A fear of running water represents, perhaps, an underlying urethral eroticism. This complicated Freudian conception seems hardly justified by the facts.

The Psychology of Idiosyncrasy. H. L. Hollingworth, Columbia University.

A study of idiosyncrasy in reaction to experimental alcohol doses suggests a type of analysis that is being extended to data from other investigations. Susceptibility to alcohol did not vary with

age, previous alcohol habits, or average pulse rate. It was definitely related to height, weight and habits of exercise, the relation being an inverse one. But more subtle factors are involved in idiosyncrasy. The ranking for susceptibility is almost exactly the reverse of that for original proficiency and for final skill. There is, moreover, almost a perfect negative correlation between susceptibility and amount of gain through practise. Native capacity in tests and ability to learn or to advance in skill characterize those individuals who are least susceptible to the damaging effects of alcohol no work. A marked negative correlation between pulse change and effect on work processes suggests that susceptibility cannot be measured by tests alone. The problem of idiosyncrasy represents only one of many interesting problems in pharmaco-psychology. Something even more general than intelligence, namely, the quality of the organism, seems to be indicated.

A Psychological Comparison of Superior Duplicate Twins. ARNOLD GESELL, Yale University.

Olga and Orma are a most remarkable pair of twins. Their intelligence was measured at the age of seven and again at eight. The average I.Q. is 183 for Olga, and 181 for Orma. These quotients with one or two exceptions are higher than any hitherto reported. Notwithstanding diligent search, the highest I.Q. found in the first canvass of California children was 170. Both of these twins are therefore exceptionally superior.

Of greater psychological importance, however, is the astonishing similarity of their mental attainments and reactions. A comparative clinical study of the two children was made along the following lines: (1) Developmental history. (2) Physical characteristics. (3) Binet ratings. (4) Psycho-metric tests. (5) Personality traits. The results of the study are reported under these headings with the aid of photographs and charts.

1. Developmental History. Russian Jewish descent. Nationality, American. Birth, slightly premature by Caesarian section. Ancestry, superior. Talked in sentences at the age of 11 months; learned parts of speech at the age of three years; read French at 4 years; entered grade III at six; grade V at 7; grade VI at 8. Have read the French edition of the Book of Knowledge, are reading the Bible in Italian; are versed in Esperanto and have embarked on Russian.

2. Physical Characteristics. Marked similarity in stature, appearance, dentition, anthropometric measurements, medical history and biochemical reactions.

3. Binet Ratings. Olga's I.Q. at 7, 188; at 8, 179; Orma's I.Q. at 7, 181; at 8, 181. Olga failed in three tests passed by Orma, and Orma failed in one passed by Olga. Comparative ratings of quality of responses showed equality in twelve tests and very slight superiority in favor of Orma in thirteen tests.

4. Psychometric Tests. Seventeen supplementary tests, including standard performance and educational tests, were applied. Combining the results of all the tests for which mental age norms were available, Olga scored an average mental age of 13.6; Orma, 13.9 years. A psychograph plotting the results for the individual tests shows a remarkable degree of cohesion between the two lines. The S.D. for Olga is 2.83; for Orma, 2.91.

5. Personality Traits. Data were obtained by observation and by written questionnaire inquiring into likes, dislikes, play interests, etc. Surprising identities and similarities were discovered. Emotional traits, sense of humor and social qualities were highly developed. No abnormalities were found.

The report will confine itself mainly to the comparative features and their significance.

New Approach to the Study of Genius. LEWIS M. TERMAN, Stanford University.

A description of methods being used in a research with gifted children of California. An attempt is being made to locate about one thousand of the brightest children enrolled in the public schools of the state. Effort is being made to insure that the gifted children shall be as nearly as possible representative of their class. Each child will be given at least two intelligence tests, and extensive data are being collected on early development, physical conditions, school success and home environment. In addition, an extensive test is being arranged for the diagnosis of interests and general information. School accomplishment will be measured by means of a battery of standard achievement tests. A systematic search is being made for superior children in the schools of Los Angeles, San Francisco, Oakland, Berkeley, and a few other larger cities. Nearly all the remainder of the state will be covered by the use of a simplified plan. The later careers of the children will be followed for as many years as possible.

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E. Rubin. *Visuellwahrgenommene Figuren.* Kopenhagen: Gyldenaslke, 1921. Pp. xii + 244.

R. H. Wheeler. *The Synesthesia of a Blind Subject.* Eugene, Ore.: Univ. of Oregon, 1920. Pp. 61.

R. Peter and W. Stern. *Die Auslese befähigter Volksschuler in Hamburg.* Leipzig: Barth, 1919. Pp. x + 157. M. 22.

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O. Lippmann. *Die psychiche Eignung der Funkentelegraphisten.* Leipzig: Barth, 1919. Pp. 40. M. 1.80.

J. Peterson and Q. J. David. *The Psychology of Handling Men in the Army.* Minneapolis: Perine, (no date). Pp. v + 146.

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THE PSYCHOLOGICAL BULLETIN

1. GENERAL

144. MONTAGUE, W. P., Variation, Heredity and Consciousness. *Proc. Aristotelian Soc.*, 1920–21, 21, 13–50.

This article is a mechanist answer to the vitalist challenge in connection with variation, heredity and consciousness. The paper consists of three sections, in the first of which, explaining variation, the author offers the conception of biological vectors, "according to which all of the unpurposed yet purposeful products of telogenesis, not only in the germ-plasm but in the brain when occupied with creative imagination, can be explained as the result of a system of protoplasmic stresses, and, as such, felicitously expressive in their novelty and pertinence of the whole from which they originate."

In the second section heredity is explained by "conceiving of the germ-cell as a system of super-forces or superimposed stresses definable in mechanical terms yet embodying a manifold of invisible intensive determinants equal in richness to the serial events of its ancestral past and capable of unfolding and reproducing its own pattern by a kind of induction through the serial stages of embryonic growth."

As an explanation of mind, in section three, the author proposes the conception that "the structure of conscious life is analogous to the structure of life in general and capable of being explained in the same way, except that the system of cerebral super-forces, in which the past is stored up in the present, is composed of traces of potential energy acquired by the brain through the transformation of the kinetic energies of sensory nerve currents:"

J. H. SINCLAIR (Smith)

145. Czuber, E., Zur Theorie der linearen Korrelation. *Arch. f. d. ges. Psychol.*, 1921, 41, 310–333.

146. Wirth, W., Bemerkungen zu der vorangehenden Abhandlung von Herrn Prof. E. Czuber. *Arch. f. d. ges. Psychol.*, 1921, 41, 334–352.

Ausgehend von einer ausführlichen Besprechung der Darstellung der Korrelationsrechnung in *W. Wirth's* Beitrag "Specielle psychophysische Massmethoden" zu Abderhalden's Handbuch der biologischen Arbeitsmethoden (4. Lieferung) gibt Czuber für eine beliebige Lage des Koordinaten-Anfangspunktes der Korrelationstafel eine elegante gemeinsame Ableitung der beiden Regressionen und der Wirth'schen "mittleren linearen Funktion," d. h. der grossen Achse der Fehlerellipsen, die das mittlere Quadrat der auf sie bezogenen "Fehlermomente" zu einem Minimum macht. Die repräsentative Bedeutung dieser dritten Funktion wird bedingt anerkannt, daneben aber auch noch eine solche jeder Regression im einzelnen.

Wirth versucht hiergegen vor allem den Unterschied herauszuarbeiten, der in den Anwendungen der Methode der kleinsten Quadrate zwischen der Korrelationstafel und der systematischen Beobachtung einer Abhängigkeit bestehen muss. Jene Tafel ist völlig zufällig begrenzt, und die Anzahl der Exemplare in den partiellen Kollektivgegenständen je eines konstanten Argumentes der einen von beiden Variablen nimmt nach aussen hin immer mehr ab. Bei der systematischen Beobachtung können dagegen zu jeder Stufe der unabhängigen Variablen beliebig viele Fälle gesammelt werden. Nur in diesem Falle gibt aber der einseitige Ansatz der Beobachtungsgleichungen für die Fehler der abhängigen Variablen die gesuchte mittlere Funktion. Dafür aber hier bei Zugrundelegung der anderen Variablen zur richtigen Lösung eine Ergänzung der beobachteten Kollektivgegenstände vorgenommen werden. Bei der Korrelationstafel ist dagegen dieser einseitige Ansatz der eben zu den sog. "Regressionen" führt, für keinen von beiden Ausgangspunkten ausreichend, sondern es muss eine principielle Vermittelung zwischen beiden gesucht werden, wie sie in jener "mittleren" Funktion gefunden wurde. W. Wirth (Leipzig)

147. Tschermak, A., Ueber einen Apparat (Justierblock) zur subjektiven Bestimmung der Pupillardistanz und zur Festsetzung der Stellung der Stellung der Gesichtslinien. *Arch. f. d. ges. Physiol.*, 1921, 188, 21–24.

Zu seinem früher veröffentlichten Universal-Kopf-bezw. Gebiss-

halter hat T. einen Justierblock konstruiert, der exakte Bestimmung der Pupillardistanz (=Basalstrecke), genaue Parallel- und Wagrechtstellung der Gesichtslinien, sowie Feststellung der sagittalen Halbierungsebene der Basalstrecke und einer dazu senkrechten frontalen Ebene ermöglicht. Genauere Einrichtung sowie Handhabung des 18 : 5 : 5 cm grossen Justierblockes siehe Originalbeschreibung. Als Hauptprinzip ist das u. a. bereits von Hering benützte Prinzip der Nadelkennzeichnung beider Gesichtslinien verwertet: An der Stirnfläche des Blockes trägt ein Schieber 2 Nadeln (die eine im Nullpunkt fixiert, die andere auf Nonius verschiebbar). Ihre Punkteinstellung wird durch zweckmässige Beleuchtung unterstützt.

HAPPEL (Frankfurt a/M.)

148. "Student," An Experimental Determination of the Probable Error of Dr. Spearman's Correlation Coefficients. *Biometrika*, 1921, 13, 263–282.

As most users of correlation formulæ know, the methods proposed by Spearman for "rank"-correlation have been severely criticized by Pearson. Spearman proposed, without proof, the following formulæ:

$$\rho = 1 - \frac{6\Sigma(D^2)}{N(N^2 - 1)}, \qquad \text{P.E.}_{(r=0)} = .6745/\sqrt{N},$$

$$R = 1 - \frac{6\Sigma(D)}{N^2 - 1}, \qquad \text{P.E.}_{(r=0)} = .4266/\sqrt{N}.$$

Pearson showed that the relation between r (product moment) and Spearman's ρ for normal correlation is $r = 2 \sin (\pi/6\ \rho)$, and between r and Spearman's R is $r = 2 \cos \pi/3\ (1 - R) = 1$, and that the p.e. of r as found by the ρ-method is

$$\frac{.7063(1 - r^2)}{\sqrt{N}}\ (1 + .042r^2 + .008r^4 + .002r^6),$$

but he did not succeed in finding an expression for the p.e. of R, or of r as calculated from it, although he pointed out that the range of R is from $+1$ to $-.5$ only, and that therefore its p.e. might be expected to be smaller than that of a coefficient having range from $+1$ to -1. For this reason, the apparent gain in reliability in the use of this coefficient is wholly illusory.

"Student" has taken the same data that has been used in previous experiments, viz., 3,000 measurements of height and middle finger length (both distributions nearly normal, $r = .66$), fractionated into 750 samples of 4 cases each, 375 samples of 8 cases, or 100 samples of 30 cases, and has calculated the correlation for each sample, by several methods, including the product moment method, with and without Sheppard's corrections for the σ's, the ρ- and the R-methods. Owing to the very frequent occurrence of ties in rank, a method of correcting for ties was developed, which in the case of the ρ-method is simple and easily practicable. It shows that the corrected ρ is given by

$$\rho = 1 - \frac{\Sigma(D^2)}{\frac{N(N^2-1)}{6} - (T_x + T_y)}$$

if the difference between T_x and T_y is not large. T_x is the sum of all quantities $t(t^2-1)/12$ for each group of t individuals tied with respect to the $_x$-character, and T_y is the homologous quantity for ties with respect to the $_y$-character. Correction of R for ties is relatively awkward and, in consideration of the other disadvantages of the R-method, is of little pratical value.

Tables showing the distribution of the various r's, ρ's and R's, as actually calculated for the different sizes of sample, are given. Anyone who has occasion to work with small samples, or to interpret published results of such work, will be well repaid for his trouble by a study of these tables. The following comparison of means and standard deviations of these distributions is also instructive:

	Samples of 8		Samples of 30	
	Mean	S.D.	Mean	S.D.
r (p.m., with Shep. cor.)	.624	.274	.661	.101
r (p.m., without Shep. cor.)	.614	.271	—	—
r (ρ-method)	.586	.291	.639	.113
r (R-method)	.566	.309	.638	.122
ρ	.580	.289	.624	.116
R	.407	.237	.428	.100

It should be remembered that the correlation in the "population" from which these samples are drawn is .66. I have calculated the theoretical standard deviation of r by the product moment

method for samples of 8 and 30 cases, and of r by the ρ-method for samples of the same size, by the formula $(1 - r^2)/\sqrt{N}$, and the formula for the p.e. of r by the ρ-method (divided by .6745) given at the beginning of this abstract, and find the following values:

	Samples of 8	Samples of 30
S. D. of r (prod. mom.)	.200	.103
S.D. of r (ρ-method)	.212	.110

The agreement with the actually observed values is good for samples of 30, but rather poor for samples of 8. It should also be noted that the mean observed r agrees better with the true r for samples of 30 than for samples of 8, though both are based on exactly the same data. All of which means that Spearman's formulæ fall short of the product moment method in reliability, despite his claims to the contrary, and that small samples do not exhibit existing correlation very accurately, regardless of the method used to determine it. No method can do more than reflect the facts, but the facts themselves are commonly distorted in small samples.

C. R. Brown (Michigan)

149. Morant, G., On Random Occurrences in Time and Space, when followed by a Closed Interval. *Biometrika*, 1921, 13, 309–337.

If an event happens at random, and, in a very long period of time, once per interval of m, on the average, the chance of its non-occurrence in an interval t is $e^{-t/m}$. The same theory is applicable to random occurrences in space also. But in practice it is often true that not more than one event *can* happen within a finite interval of at least approximately determinate length. In other words, every event is followed by a closed interval, within which the event cannot recur, and, therefore, events of which this is true can never occur strictly at random. The author confines himself to the extension of the theory of purely random events to the case of events followed by a closed interval, and gives one illustration of its application.

Since all psychological "events" are preëminently events followed by a closed interval, however else they may fail to conform to the definition of random events, it seems to the reviewer that this paper may contain the germ, at least, of an analytical method of considerable use to the psychologist. I suggest one possibility. McDougall's "Spot-Pattern" test can be easily so modified as to

present a series of stimuli which occur, objectively, strictly at random in time. The subject's reactions, which cannot be random events, will conform to a different law of distribution, whose divergence from the law of distribution of strictly random events can be described by means of one or two numerical quantities, by the methods of this paper, and perhaps much more adequately than is otherwise possible.

C. R. Brown (Michigan)

2. NERVOUS SYSTEM

150. Kantor, J. R., The Nervous System, Psychological Fact or Fiction? *J. of Philos.*, 1922, **19**, 29–49.

The psychologist is slowly extricating himself and his science from the metaphysical alliances of the past but the work has not yet been accomplished as is seen in the way he handles the nervous system. There are factual and fictitious elements in our conceptions of just this nervous system. In consequence we misinterpret nervous function and also prevent future progress in interpretation of psychological phenomena. As physiological mechanism the nervous system is truly remarkable for its coördinating and integrating functions, but how reflexes operate as facts of synaptic coördination affords us meager notions of psychological action. Too often use of neural apparatus as an explanatory factor in psychological interpretation is misleading. Holt shows right plainly the mistake we are making. Neural theories of a certain sort take the nervous system out of its perspective. It is urged, therefore, that psychology be emancipated from physiology for a neurotic theory must stand in the way of development of a concrete science of human behavior. Since so little is really known about neural mechanisms in their exact workings it behooves us to avoid possible false hypotheses. All psychological organisms are biological organisms. Psychological phenomena are neither physiological nor physical and we should not attempt to transform them into such.

T. R. Garth (Texas)

151. Fleisch, A., Die Wasserstoffionenkonzentration als Regulator der Atemgrösse. *Arch. f. d. ges. Physiol.*, 1921, **190**, 270–279.

Die Frage, ob die Kohlensäure des Blutes durch spezifische Eigenschaften oder lediglich durch ihre H-Ionenkonzentration das

Atemzentrum anregt, wie Winterstein, Hasselbalch und andre für wahrscheinlich halten, war bisher noch nicht definitiv entschieden. Fleisch injizierte langsam in die Blutbahn von Kaninchen primäres Natriumphosphat und bestimmte vorher und nachher die Lungenventilation, die Kohlensäurespannung und die gebundene Kohlensäure im Blut und berechnete daraus die H-Ionenconcentration. Die letztere nahm gleichzeitig mit der Lungenventilation zu, während die Kohlensäurespannung abnahm. Daraus folgt, dass die Reaktion des Blutes und nicht die Kohlensäure an sich den Atemreiz giebt.

BETHE (Frankfurt a/M.)

152. LOEVI, O., Ueber humorale Uebertragbarkeit der Herznervenwirkung. 1. Mitteilung. *Arch. f. d. ges Physiol.*, 1921, **189**, 239–242.

Isolierte Froschherzen wurden durch Vagusreizung zum Stillstand gebracht. Die abpipettierte Ringerlösung einer Normalperiode und einer Reizperiode wurden der Erholung abwechselnd in das Herz wiedereingefüllt. Die Lösung aus der Normalperiode wirkte nicht anders wie frische Ringerlösung, die aus der Vagusreizperiode rief deutliche negativ-inotrope Wirkung hervorl Umgekehrt rief beim Krötenherzen die Ringerlösung, welche aus einer Periode der Acceleranzreizung herrührte, einem andren Herzen einverleibt positiv inotrope Wirkungen hervor.

BETHE (Frankfurt a/M.)

153. MANGOLD, E., Der Umdrehreflex bei Seesternen und Schlangensternen. *Arch. f. d. ges Physiol.*, 1921, **189**, 73–98.

Bei Seesternen zeigen auch einzelne Arme den Umdrehreflex. Sitz des Reflexes ist der Radialnerv. Ausgelöst wird er durch Rezeptoren der Haut auf der Dorsalseite der Arme. Statische Apparate fehlen.

BETHE (Frankfurt a/M.)

154. MÜLLER, F. W. P., Die Zellgruppen im Corpus geniculatum mediale des Menschen. *Monats. f. Psychiat. u. Neurol.*, 1921, **49**, 251–271.

Verf. weist eine Zelldifferenzierung im innern Kniehöcker des menschlichen Gehirns nach, die im Hinblick auf die Frage einer

strikten Aufrechterhaltung der Lokalisation im Bereich des Gesamtverlaufs der Hörbahn auch für die Psychologie Interesse hat.

TH. ZIEHEN (Halle)

155. FÖRTIG, H., Ueber Hirntumoren. *Monats. f. Psychiat. u. Neurol.*, 1921, **49**, 89–117.

Im Anschluss an zwei von psychischen Symptomen begleitete Fälle von Hirntumoren erörtert Verf. die Bedeutung des Vorder-, Zentral- und Hinterhirns für die psychischen Funktionen (Vorderhirn = Rindengebiet vor dem Sulcus præcentralis, Zentralhirn = elektrisch erregbare Region des Gyrus centralis anterior. Hinterhirn = Rindengebiet ginter dem Sulcus centralis). Er meint, dass der Quotient Hinterhirn : Vorderhirn in der aufsteigenden Säugetierreihe bis zum Mensch allmählich abnimmt. Das Hinterhirn soll vorzugsweise der "Rezeptivität" im Sinne Kants, des Vorderhirn der "Spontaneität" (= höherer zusammenfassender, abstrakter "Welt"), das Zentralhirn "bewusst ausführenden Handlungen" dienen.

TH. ZIEHEN (Halle)

156. JACOBI, W., Ueber psychische Störungen bei Basalgangliengeschwulsten. *Monats. f. Psychiat. u. Neurol.*, 1921, **49**, 125–136.

3 Fälle mit Sektionsbefund. TH. ZIEHEN (Halle)

157. SCHÄFFER, H., Beiträge zur Frage der autonomen Innervation des Skelettmuskels. I. Mitteilung, Ueber die Tiegelsche Contractur beim Menschen. *Arch. f. d. ges. Physiol.*, 1920, **185**, 42–69.

Verfasser erzielte an einem disponierten Menschen maximale (die Contractur erreicht die Höhe der sie auslösenden Contraction) Tiegelsche Contractur. Schon sehr schwache faradische und galvanische Ströme können bei gleichzeitiger Willkürarbeit und elektrischer Reizung die Contractur auslösen. Sie ist am unbelasteten Muskel aus frequenten Stromschwankungen zusammengesetzt, deren unregelmässige Amplitude mit der Muskelspannung zunimmt. Da sie auch am gelähmten Muskel (Plexusanæsthesie!) auftritt, ist sie "ein rein peripheres Phænomen." Parasympatisch erregende Substanzen fördern, sympatisch erregende und parasympatisch lähmende hemmen sie. Auch Blutleere wirkt hemmend. Die der

Contractur zugrundeliegenden Stoffwechselvorgänge werden vom autonomen Nervensystem reguliert. Dabei besteht funktioneller Antagonismus zwischen den fördernden parasympatischen und hemmenden sympatischen Antrieben.

HAPPEL (Frankfurt a/M.)

158. MANSFIELD, G., und SZENT-GYÖRGYI, A. v., Untersuchungen über die Ursache des Herzschlages. *Arch. f. d. ges. Physiol.* 1920, **184**, 236–264.

Ringerlösung, kohlensäurefrei und statt $NaHCO_3$ Kohlensäure bindende Alkalien enthaltend, bewirkt charakteristische Herztätigkeitsänderung: Schlagverlangsamung, abnorme Schlagfolge der Herzteile, völlige Umkehr (Kammerautomatie), schliesslich Herzstillstand. Ursache: Säurebindungsvermögen der Alkalien. Bleibt nur der Sinus von den Alkalien verschont, so resultiert normale Herzarbeit. Bereits untätige Reizbildungsapparate bewirken nach Reizung normale Herzkontraktion. Kohlensäure ist also nicht "Bedingung, sondern offenbar selbst der Reiz für die Herztätigkeit." CO_2 – Ringerlösung dem akapnischen Herzen zugeführt, bewirkt wieder normale Herztätigkeit. HCl – Ringerlösung verursacht wie CO_2 – Ringerlösung an Herzen mit I. Stanniusligatur Acceleration. Auch Wasserstoffionen wirken also reizend ! CO_2 hat aber spezifische Reizwirkungseigenschaften, da sie auch in neutralen Lösungen wirkt. Am Säugetierherzen: Schlagfolgeumkehr früher; Kammerautomatie schon nach 3–4 Minuten.

HAPPEL (Frankfurt a/M.)

159. SKRAMLIK, E. v., Ueber die Beziehungen zwischen der normalen und rückläufigen Erregungsleitung beim Froschherzen. *Arch. f. d. ges. Physiol.*, 1920, **184**, 1–61.

Die Erregungsleitung ist nicht schlechtweg umkehrbar. Rückläufige Erregungsleitungen zwischen zwei Herzteilen dauern länger als die rechtläufigen. Das Septum besorgt die rückläufigen, gewisse dorsale Bündel "nur oder doch ganz überwiegend" die rechtläufigen und die ventralen wie lateralen Bündel beide Erregungsleitungen. Versagt die rückläufige Leitung, so kann sie in manchen Fällen durch einige rechtläufige Erregungsleitungen "gebahnt" werden. An der Kammer läuft die normale Erregung nach Passieren der Ueberleitungsbündel wahrscheinlich sowohl zur

Spitze als zur Basis. Deshalb wäre Spitzenkontraktion *vor* Basiskontraktion möglich! Zwischen Sinus- und Vorhofkontraktion kontrahiert sich der Muskelring des Sulcus circularis, zwischen Vorhof- und Kammerkontraktion der Trichter. Diese Zwischenkontraktionen sind Klappenschlüsse.

HAPPEL (Frankfurt a/M.)

3. SENSATION AND PERCEPTION

160. KAILA, E., Eine neue Theorie des Aubert-Försterschen Phänomens. *Zeits. f. Psychol.*, 1921, **86**, 193–235.

Das Aubert–Förstersche Phänomen ist von der Akkommodation und Konvergenz unabhängig. Die Einengung des Deutlichkeitsfeldes bei zunehmender Entfernung geschicht eine Hemmung: die grösseren Reproduktionsmassen (Residuenerregungen) bedingen eine Hemmung, welche am stärksten die peripheren, leicht verdrängbaren Empfindungen betrifft. Analoges gilt für das Kostersche Phänomen.

H. HENNING (Frankfurt a/M.)

161. HENNING, H., Ein optisches Hintereinander und Ineinander (Gemischte Farbenempfindungen). *Zeits. f. Psychol.*, 1920, **86**, 144–174.

Es werden Anordnungen geschildert, wie man an genau demselben Orte zwei Farben zugleich sehen kann. Dies ist sowohl in derselben Ebene, als hintereinander möglich. Im ersten Fall seiht man z. B. dieselbe Linie sowohl rot, als blau ohne jede Verschmelzung zu Purpur. Im zweiten Fall sieht man eine hintere Farbe durch eine vordere intakte Farbe hindurch. Die verschiedenartigen Versuchsausgänge werden mit verwandten Erscheinungen von Hering und Helmholtz usf. in Beziehung gebracht.

H. HENNING (Frankfurt a/M.)

162. MOEHRKE, W., Beitrag fur Untersuchung der Schmerzempfindung. *Arch. f. d. ges. Psychol.*, 1921, **42**, 97–131.

Es handelt sich um die Ausbildung einer neuen Methode zur Messung des Schmerzes, der durch elektrische Reizung hervorgerufen wird (Tauchmethode). In einem von der Starkstromleitung abgezweigten Nebenstromkreise sind ein Milliampèremeter, ein Widerstand mit verschiebbarem Kontakt und zwei Gefässe

mit Kochsalzlösung eingeschaltet. Durch Eintauchen der Finger in die Gefässe wird der Nebenstromkreis geschlossen. Die Stromstärke ist von 0 bis 6 Milliampère regulierbar und bildet ein Mass für die Stärke des Reizes. Es wurden folgende Resultate erhalten: der durch die elektrische Reizung ausgelöste Schmerz fällt bei gleichbleibender und ununterbrochener Einwirkung des Reizes ziemlich rasch ab und verschwindet schliesslich. Es tritt eine Anpassung der Schmerzempfindung an den Reiz ein. Auch nach Aufhören des Reizes bleibt die Schmerzschwelle noch eine Zeit lang erhöht.

W. Moehrke (Königsberg)

163. Dodge, R., The Latent Time of Compensatory Eye-movements. *J. of Exper. Psychol.*, 1921, 4, 247–269.

In this article Professor Dodge continues his account of technique and results in his work on compensatory eye-movements. Any attempt to measure eye-reaction compensatory to bodily rotation involves the difficulties of securing sudden rotation of the body mass, and the recording of head- and eye-movements.

In the present investigation, *O* sat upon a bench seat on a turn-table. The table was set in rotation by means of rubber springs which were held in tension by *E* until the moment of release. With practice *E* was able to secure a quick and noiseless onset of rotation. It was necessary to place the recording camera, head rest, lighting system with resistances, *etc.*, upon the revolving table so that all accessory apparatus would rotate with *O*. Head- and eye-lines were recorded by the method described in a previous article. The difficult problem of obtaining an adequate rotation record was solved by placing a concave mirror on a shaft rising from an excentric axis. The shaft was kept motionless while the turn-table revolved about it by a friction belt from a pulley on a tripod base to a pulley of the same diameter on the excentric shaft.

An examination of the records secured reveals the fact that the average latent time of reflex compensatory eye-movements is about 50 sigma,—a reaction time three or four times shorter than the latency of saccadic eye-reactions. The records further bring to light a "coördinate" compensatory eye-movement, compensatory to voluntary head-movement. The latency of this type of eye-movement is extraordinarily short, amounting in some cases to less than 16 sigma, and in certain instances, under a refinement

of technique, approximately to zero. The latencies of both of these types of compensatory eye-movement are much less than the latency of ocular pursuit movements which begin after a natural reaction time of the order of 200 sigma. Pursuit movements, moreover, are accompanied by a series of inaccurate approximations to pursuit, whereas reflex compensations show less hesitation in their onset. Coördinate movements of compensation are distinguished from the above types in this respect by an astonishing smoothness. C. C. PRATT (Clark)

164. GILLILAND, A. R., The Taste Sensitivity of an Anosmic Subject. *J. of Exper. Psychol.*, 1921, **4**, 318–326.

Contrary to what might be expected, experiments upon an anosmic subject indicate that lack of smell is not compensated for by greater sensitivity to the primary tastes, nor by greater ability to detect complex tastes. C. C. PRATT (Clark)

165. MITTELMANN, B., Von der stichartigen Mitempfindung. *Arch. f. d. ges. Physiol.*, 1920, **185**, 93–110.

Unter 9 Personen fand Mittelmann bei 8, dass es schmerz- bezw. kälteempfindliche Endorgane mit charakteristischer, punktartig lokalisierter Schmerz-bezw. Kältemitempfindung gibt. Die Primärpunkte (Reizung mit Fingernagel) und die Sekundärpunkte (immer auf derselben Seite wie jene) finden sich nur in der spinalen Nervenregion. Den Primärpunkten über dem D-III Segment entsprechen tiefer gelegene Sekundärpunkte. Unterhalb dieser "Wendegrenze" umgekehrtes Verhalten. Die Erscheinung wird "erklärt" durch eine besondere, einsinnige Art der Ausbreitung der Erregung von der Bahn des primären Punktes auf jene des Sekundärpunktes. HAPPEL (Frankfurt a/M.)

166. GELLHORN, E., Untersuchungen zur Physiologie der räumlichen Tastempfindungen unter Berücksichtigung der Beziehungen des Tastraumes zum Sehraume. I. Mitteilung. (Weitere Beiträge zum Studium der Uebungswirkungen.) *Arch. f. d. ges. Physiol.*, 1921, **189**, 215–238.

Die Schnelligkeit, mit der Erwachsene eine bestimmte Strecke abtasten, hat bei Wiedergabe derselben durch eine nach ihrer Empfindung gleichgrosse optische Strecke den Einfluss, dass der bei der Schätzung unterstützende Zeitsinn die langsam dargebotene

Strecke gegenüber der gleichgrossen, aber schnell dargebotenen Strecke überschätzen lässt. Bei Kindern oft umgekehrtes Ergebnis. Besondere Aufmerksamkeitsconcentration auf die zuerst gegebene schnelle Strecke?—Strecken verschiedener Grössen, mit gleicher Geschwindigkeit dargeboten, werden mit Grössenzunahme stärker unterschätzt. Im allgemeinen wird richtiger geschätzt, "wenn zur Sehstrecke die entsprechende 'Taststrecke' angesetzt werden soll, als umgekehrt."—Bei Ortssinnversuchen konnte mit der Volkmannschen wie Weberschen Methode (erstere weniger fein als letztere) durch Uebung erhebliche Verfeinerung mit grosser Uebungsfestigkeit erzielt werden.

HAPPEL (Frankfurt a/M.)

167. VON HESS, C., Die Rotgrünblindheiten. *Arch. f. d. ges. Physiol.*, 1920, 185, 147–164.

H. beschreibt neue Methoden vornehmlich zur messenden Untersuchung der Formen von Rotgrünblindheit. Auf 6 verschiedenen Wegen zeigt er, dass Unterwertigkeit für Blau und Gelb den Rotblinden vom Grünblinden unterscheidet, "dass er also zwischen dem Grünblinden und dem total Farbenblinden steht." Grünblinde gleichen zum Teil in ihrer Blaugelbempfindung den Normalen, zum Teil sind sie ihnen überlegen. Grünblinde sind folglich blaugelbüberwertige, Rotblinde blaugelbunterwertige Rotgrünblinde. Die für helladaptierte Rotblinde bei hoher Intensität hergestellte Gleichung zwischen Rot und Grün wird durch 2–3 fache Verstärkung des Grün zur Gleichung für helledaptierte Grünblinde. Wird Rot und Grün durch Episkotister gleichmässig an Intensität vermindert, so wird die Rotblindengleichung zur Gleichung von dunkeladaptierten Grünblinden.

HAPPEL (Frankfurt a/M.)

168. FISCHER, M. H., Messende Untersuchungen über das scheinbare Gleichhoch, Geradevorn und Stirngleich. (Ein Beitrag zur Lehre vom funktionellen Koordinatensystem des Gesichtsraumes.) *Arch. f. d. ges. Physiol.*, 1921, 188, 161–240.

Fischer untersucht die Beziehungen zwischen dem Koordinatensystem des subjektiven Sehraum (Gleichhoch u. s. w.) und dem des objektiven Gesichtrsaum (horizontal u. s. w.). Das subjektive Raumkoordinatensystem ist eine komplizierte Funktion des objektiven Gesichtsraumes, die experimentell bestimmt wird. Die Diskrepanzen zwischen den beiden Koordinatensystemen sind

über dies abhängung von der Stellung des Kopfes im Raume, von Konvergenz und Akkomodation und rind verschieden für momokulare und binokulare Einstellung. Ganz bestimmte Augenstellungen d. h. Spannungen der Augenmuskeln sind mit dem subjektiven Eindruck des scheinbar Gleichhoch u. s. w. verknüpft, jede Spannungskomponente hat einen bestimmten Reizwert, der durch äussere Momente verändert werden kann.

STEINHAUSEN (Frankfurt a/M.)

169. KLEIJN, A. de, und MAGNUS, R., Ueber die Funktion der Otolithen. 1. Mitteilung. Otolithenstand bei den tonischen Labyrinth-reflexen. *Arch. f. d. ges. Physiol.*, 1921, **186**, 6–38.

Von den Otolithen gehen tonische Reflexe aus, deren Stärke mit der Stellung des Kopfes im Raume sich verändert und die ausfallen, sobald die Otolithen durch Zentrifugieren abgeschleudert sind. Die Resultate der Abschleuderung der Otolithen werden in späteren Arbeiten erörtert. Im Vorliegenden wird die Stärke der einzelnen Reflexe bei den verschiedenen Kopflagen beobachtet und der Otolithenstand dabei bestimmt und daraus auf die Wirksamkeit der Otolithen geschlossen. Beim dezerebrierten Kaninchen beobachtet man einen tonischen Labyrinthreflex auf die Streckmuskeln der Extremitäten, der sein Maximum hat, wenn der Utrikulusotolith an der Makula hängt, und sein Minimum, wenn der Utrikulusotolith auf die Makula drückt. Der Reflex wird also vom Utrikulusotolith ausgelöst. Ebenso wird abgeleitet, dass vom Sakkulusotolithen die sogenannten Stellreflexe ausgehen, die den Kopf in die Normalstellung im Raum zurückdrehen. Der Sakkulusotolith veranlasst weiter tonische Reflexe auf die Augenmuskeln (Vertikalabweichungen und Raddrehungen). Die Reflexe sind unermüdbar, sie können jahrelang bestehen, wie die Halsdrehung nach einseitiger Labyrinthexstirpation beweist.

STEINHAUSEN (Frankfurt a/M.)

170. KLEIJN, A. de und MAGNUS, R., Ueber die Funktion der Otholithen. 2. Mitteilung. Isolierte Otolithenausschaltung bei Meerschweinchen. *Arch. f. d. ges. Physiol.*, 1921, **186**, 61–81.

Um die Otolithen zu entfernen, zentrifugieren d. K. und M. Meerschweinchen 1, 5–2, 5 Minuten lang bei einer Umlaufsge-

schwindigkeit von etwa 960–1000 Meter in der Minute. Nach dem Zentrifugieren werden die Tiere auf alle Labyrinthreflexe eingehend untersucht. Bei den Tieren, bei denen die Labyrinthreflexe noch alle vorhanden waren, konnte in der nachfolgenden Untersuchung des Labyrinthes auch Ikeine Schädigung der Otolithen festgestellt werden. Bei anderen Tieren waren die tonischen Labyrinthreflexe auf die Extremitäten, die Labyrinthstellreflexe und die kompensatorischen Augenstellungen vollkommen und dauernd verschwunden. Die Reaktionen auf Drehung aber, ebenso wie die Reaktionen auf Progressivbewegungen (Liftreaktionen u. s. w.) waren noch erhalten. Die histologische Prüfung ergab Zerstörung bezw. Abschleuderung der Otolithenmembranen und Erhaltensein der Christæ der Bogengänge. Die tonischen Reflexe müssen also durch die Otolithen vermittelt werden, die Drehreaktionen und die Reaktionen auf Progressivbewegungen sind nach der Zerstörung der Otolithen noch vorhanden, müssen also durch die Bogengänge ausgelöst werden.

STEINHAUSEN (Frankfurt a/M.)

171. KLEIJN, A. de und MAGNUS, R., Labyrinthreflexe auf Progressivbewegungen. *Arch. f. d. ges. Physiol.*, 1921, **186**, 39–60.

Nach der bisherigen Annahme (Mach, Breuer) werden Empfindungen und Reflexe auf Progressivbewegungen (bezw.-beschleunigungen) durch die Otolithen vermittelt; De K. und M. kommen dagegen zu der Ueberzeugung, dass die Reflexe auf Progressivbewegungen durch die Bogengänge ausgelöst werden. Diese Reflexe (Liftreaktion, Zehenspreizreflex und Sprungbereitschaft) sind nämlich noch vorhanden, wenn die Otolithen durch Zentrifugieren abgeschleudert sind, fallen aber aus, sobald das ganze Labyrinth herausgenommen wird. Bei Versuchen an einem Modell der Bogengänge konnte ein Ausschlag der Christahaare bei Progressivbewegungen beobachtet werden. Die Bogengänge wären danach nicht nur für die Wahrnehmung von Drehbewegungen, sondern auch von Progressivbewegungen befähigt, sodass eine Funktionsteilung zwischen Bogengängen und Otolithen einträte: Bogengänge für alle Arten von Bewegungen, Otolithen für die Lage im Raum.

STEINHAUSEN (Frankfurt a/M.)

172. Kleijn, A. de, und Magnus, R., Tonische Labyrinth- und Halsreflexe auf die Augen. *Arch. f. d. ges. Physiol.*, 1921, **186**, 82–96.

Neben die tonischen Labyrinthreflexe auf die Augen treten tonische Halsreflexe. Diese tonischen Halsreflexe auf die Augenmuskeln werden ausgelöst, wenn der Kopf nicht seine normale Lage zum Körper hat. Wird der Kopf gegen den feststehenden Körper bewegt, dann werden vom Hals aus Reflexe ausgelöst, die die Augen veranlassen, ihre Lage im Raum beizubehalten. Da bei Kopfbewegungen im allgemeinen die Otolithenreflexe verändert werden, so kommt eine Überlagerung der beiden Reflextypen zustande. Isoliert kann man die Halsreflexe studieren entweder bei labyrinthlosen Tieren oder bei Tieren, bei denen man den Kopf fixiert und den übrigen Körper bewegt. Man findet dann je nach der Art der Bewegung des Rumpfes Rollungen oder Vertikal- bezw. Horizontalabweichungen der Augen. Die Halsreflexe fallen aus, sobald die ersten zwei bezw. drei hinteren Cervicalwurzeln durchschnitten sind. Die Halsreflexe bei fixiertem Kopf sind sehr geeignet, die antagonistische tonische Innervation am isolierten Augenmuskel zu demonstrieren.

Steinhausen (Frankfurt a/M.)

173. Ebbecke, U., Ueber das Augenblicksehen. Mit einer Bemerkung über rückwirkende Hemmung. *Arch. f. d. ges. Physiol.*, 1920, **185**, 181–195.

Beim Sehen mit Momentbelichtung (Augenzwinkern, einfacher photographischer Momentverschluss) lässt sich die Entstehung optischer Erregungen und entoptischer Erscheinungen viel besser verfolgen als beim gewöhnlichen Sehen: grössere Helligkeit, geringere Farbsättigung des Momentbildes, anfängliches Ueberwiegen von Irradiation und Simultankontrast, Wirkung der lokalen und allgemeinen Adaptation. Der erste Eindruck (Momentanbeleuchtung) wird nur dann aufgefasst, wenn ihm keine weiteren andersartigen Eindrücke folgen. Es tritt beim Sehen im Dauerlicht eine rückwirkende Hemmung für die Eindrücke im Beginn des Lichtreizes ein. Diese rückwirkende Hemmung wird auch bei anderen psychophysischen Vorgängen als Erklärungsprinzip herangezogen, so wird Unterschied des Traumzustandes zu dem des wachen Denkens im Fortfall rückwirkender Hemmungen gesehen.

Steinhausen (Frankfurt a/M.)

174. Ebbecke, U., Ueber das Sehen im Flimmerlicht. *Arch. f. d. ges. Physiol.*, 1920, **185**, 196–225.

Das Auge ist beim Sehen im Flimmerlicht relativ dunkeladaptiert (Momentanadaptation). Bei der Unterbrechung des Reizes kommt der in Moment der Unterbrechung erreichte Erregungszustand zum Bewusstsein, sodass durch die Beobachtung bei verschiedenen Flimmerfrequenzen die Entstehung der Erregung analysiert werden kann. Helligkeit, Irradiation und Simultankontrast erreichen nach einer bestimmten Beleuchtungszeit ein Maximum, um dann wieder abzunehmen. Bei farbiger Reizung findet bei einer bestimmten Flimmerfrequenz ein Umschlag in eine annähernd komplementäre Farbe statt, eine helle gelbote Fläche sieht z. B. im Flimmerlicht leuchtend grün aus. Auch bei Momentanbeleuchtung (1/50—1/100 sek.) lässt sich dieser Farbenumschlag beobachten. Bei noch kürzerer Momentanbeleuchtung erscheint die Fläche wieder rot, aber gesättigter wie bei Dauerbeleuchtung. Die Erscheinungen des Farbenumschlags sind ein Beweis für den phasischen Verlauf der optischen Erregung und beruhen nicht auf Ermüdung, sondern auf einer während der Reizung einsetzenden aktiven Gegenwirkung.

Steinhausen (Frankfurt a/M.)

175. Köllner, H., Das gesetzmässige Verhalten der Richtungslokalisation im peripheren Sehen nebst Bemerkungen über die klinische Bedeutung ihrer Prüfung. *Arch. f. d. ges. Physiol.*, 1920, **184**, 138–155.

Die Richtungslokalisation beim excentrischen Sehen mit einem Auge wird nach K. nicht wie beim fovealen Sehen auf ein Zyklopenauge bezogen, vielmehr erfolgt die Lokalisation in der temporalen Gesichtsfeldhälfte entsprechend der Lage des Netzhautbildes. In der nasalen Gesichtsfeldhälfte wird sie bestimmt durch die Lokalisation, die von dem nicht sehenden anderen Auge vorgenommen würde, wenn es auf denselben Fixationspunkt eingestellt wäre. Das Ueberwiegen der nasalen Netzhauthälfte wird mit einer stärkeren, zentralen Vertretung der gekreuzten Sehnervenfasern erklärt und auf entwicklungsgeschichtliche Gründe zurückgeführt.

Steinhausen (Frankfurt a/M.)

176. Ebbecke, U., Der farbenblinde und schwachsichtige Saum des blinden Flecks. *Arch. f. d. ges. Physiol.*, 1920, **185**, 173–180.

E. gibt einige einfache Verfahren an zur Demonstration der Farbenblindheit und Schwachsichtigkeit in der Umgebung des blinden Fleckes. In Analogie zur Theorie der Hautsinnesorgane wird aus der Farbenblindheit bei erhaltenem Lichtsinn gefolgert, dass bei der Bunterregung mehr Zwischenglieder erregt werden müssen, wie bei der Schwarzweisserregung. Infolge der Untererregbarkeit des Papillensaumes kann der blinde Fleck unter gewissen Umständen subjektiv sichtbar werden.

Steinhausen (Frankfurt a/M.)

177. Kreidl, A., und Gatscher, S., Physiologisch-akustische Untersuchungen. 1. Mitteil. Zur Frage der Entstehung zentraler Schwebungen. *Arch. f. d. ges. Physiol.*, 1920, **185**, 165–172. . . . 2. Mitteil. Ueber das diotische Schwebungsphänomen bei einem einseitigen Tauben (Acusticustumor). *Arch. f. d. ges. Physiol.*, 1921, **190**, 106–107.

In vier Fällen von einseitiger Taubheit (darunter ein Fall von Akustikustumor) konnten K. und G. keine binotischen Schwebungen erzeugen. Dieser Befund spricht gegen die Annahme der Entstehung der binotischen Schwebungen durch metotische Fortleitung des Schalles von einem zum anderen Ohr, vielmehr für eine zentrale Entstehung.

Steinhausen (Frankfurt a/M.)

178. Ebbecke, U., Entoptische Versuche über Netzhautdurchblutung. *Arch. f. d. ges. Physiol.*, 1921, **186**, 220–237.

Durch Erhöhung des intraokularen Druckes (vor das Auge eingesetzte Glaskapsel, in der der Luftdruck erhöht werden kann) werden entoptische Erscheinungen (pulsierende Gefässfigur, Druckphosphene u.s.w.) hervorgerufen, die nicht so sehr auf mechanischer Reizung des Sehepithels, als vielmehr auf Veränderung der Blutverteilung zurückzuführen sind. Anämie setzt die Erregungshöhe des Sehepithels herab, Hyperämie steigert sie, die Erregungshöhe ist also von der Durchblutung der Netzhaut abhängig (vasomotorische Adaptation).

Steinhausen (Frankfurt a/M.)

179. Maier, M. und Lion, H., Experimenteller Nachweis der Endolymphbewegung im Bogengangsapparat des Ohrlabyrinthes bei adäquater und kalorischer Reizung. *Arch. f. d. ges. Physiol.*, 1921, **187**, 47–74.

In bezug auf die Endolymphströmunghypothese ist vielfach die Meinung vertreten, das Lumen der Bogengänge sei zu klein, als dass bei den üblichen Reizungsmethoden eine richtige Stömung der Endolymphe zustande kommen könne. Maier und Lion gelang es, nach kalorischer Reizung eine kräftige Endolymphströmung im vorderen Bogengang der lebenden Taube mikroskopisch (nach Glyzerinaufhellung) zu beobachten. An Bogengängen toter Tauben und Fische fanden M.u.L. in den meisten Fällen eine spontane, dauernde, ausserordentlich rasche Strömung, die sie auf die Folgen der Verdunstung an der freigelegten Stelle (Ewald'sche Brücke) zurückführen. Auch eine Nachströmung nach Rotation konnten sie an einem Präparat der Taube nachweisen.

Steinhausen (Frankfurt a/M.)

180. Ebbecke, U., Ueber zentrale Hemmung und die Wechselwirkung der Sehfeldstellen. *Arch. f. d. ges. Physiol.*, 1921, **186**, 200–219.

Hemmung, Hemmungsrückschlag und Hemmungsänderung finden sich nicht nur bei motorischen Reflexen (Weber, Hering u.a.), sondern auch auf sensiblem (Hemmung des Vibrationsgefühls im Arm durch sanftes Bestreichen der Hand), sekretorischen (Schweiss- und Speichelinnervation), und Psychophysischem Gebiet (Schlaf und Aufmerksamkeit). Auf optischem Gebiet führt die Lehre von der Hemmung zu einer Weiterführung der Gegenfarbentheorie, wobei die Kontrast und Nachbilderscheinungen durch Hemmung, Hemmungsrückschlag u.s.w. in den verschiedenen Neuronengliedern erklärt werden. Steinhausen (Frankfurt a/M.)

181. Troland, L. T., The Colors Produced by Equilibrium Photopic Adaptation. *J. of Exper. Psychol.*, 1921, **4**, 344–390.

It is an inevitable deduction from the Hering theory of vision that equilibrium adaptation of the retina to any stimulus produces a sensation of neutral gray. With the notion of a general phenomenon of adaptation there can be, of course, no quarrel; but agreement has not yet been reached regarding the limits of this adaptive process, nor the conditions underlying fluctuation during

adaptation. The experiments here reported tend to cast considerable doubt on the validity of Hering's corollary that chromatic and achromatic stimuli appear as neutral grey when adaptation reaches its asymptotic limit.

A large sheet of white drawing paper, illuminated by early afternoon sunlight, was fixated steadily for ten minutes. The initial dazzling brightness rapidly decreased until after one minute it appeared around one twentieth its original intensity, and remained at this intensity throughout the remainder of the period of exposure. Any nearer approach to a neutral grey could not be observed. Similar experiments with colors revealed no permanent disappearance of the original hue, although there was, of course, marked decrease in saturation and brightness. In a few instances, where chromatic stimuli of exceedingly high intensity were employed, the original hue altered during adaptation, but never involved a reduction of the sensation to neutral grey. Such experiments would seem to suggest that the equilibrium sensation is not neutral grey but, rather, that it varies widely with the conditions under which adaptation is established.

The well-recognized fact that spot stimuli fluctuate under adaptation has usually been explained on the Hering theory by reference to eye-movement and consequent differential recovery of the retina. But if large angle stimuli, to which recovery by eye-movement is impossible, disappear under adaptation, and then reappear, the return to visibility cannot be due to eye-movement. The explanation must be sought in the size and activity of the pupil, which is capable of variation from the maximum of 7.5 mm. to a minimum of 1.5 mm.

In order to determine the rôle played by the pupil, experiments were performed in which the stimulus surface was perforated at the fixation point, and a reading telescope placed in line with the eye of the subject, who was provided with a reaction key. In this way *O*'s reactions signifying disappearance of the sensation could be correlated by *E* with pupillary contractions. In every series of observations the coincidences between pupillary contractions and the disappearance signals were very striking. With one subject there was perfect coincidence in 95 per cent. of the cases. In a crucial experiment with the artificial pupil, in which spot stimuli were used, the number of fluctuative disappearances in several thousand observations was negligible. These facts would appear to prove that variations in the size of the natural

pupil are responsible for fluctuations of sensations of supraliminal sensory equilibrium.

On the basis of these experiments Troland argues that "a visual sensation is not a process . . . which goes on only at the cost of its final self-destruction." Stimuli of low intensity, to be sure, may disappear below the threshold by adaptation. But stimuli of moderate or high intensity (supraliminal equilibrium sensations) do not adapt out permanently to neutral grey. Fluctuations of sensations of supraliminal equilibrium are due to the activity of the natural pupil.

C. C. Pratt (Clark)

5. MOTOR PHENOMENA AND ACTION

182. Reijs, J. H. O., Ueber die Veränderungen der Kraft während der Bewegung. *Arch. f. d. ges. Physiol.*, 1921, **191**, 234–257.

Reijs bestimmte mit verschiedenen Dynamometern eigner Konstruktion die Kraft menschlicher Bewegungen bei verschiedenen Winkelstellungen des untersuchten Gliedes (Armbeugen und Strecken, Seitwärtsheben, Pronation und Supination u. s. w.). Die Resultate werden in Curvenform wiedergegeben. Discussion der Resultate andrer Autoren und Auseinandersetzungen über den Begriff der absoluten Muskelkraft. Statistische Tabelle über die Kraft des Handdrucks bei Männern und Frauen verschiedenen Lebensalters (6–60 Jahre) und Vergleich der Kraft der rechten und linken Hand.

Bethe (Frankfurt a/M.)

183. Voelkel, H., Die Beziehungen des Ruhestroms zur Erregbarkeit. *Arch. f. d. ges. Physiol.*, 1921, **191**, 200–210.

Der Ruhestrom (Demarkationsstrom) des Nerven und Muskels erweist sich bei der Narkose unabhängig von den Veränderungen der Erregbarkeit, während die negative Schwankung parallel mit den Erregbarkeitsänderungen sich verändert.

Bethe (Frankfurt a/M.)

184. Kauffmann, F., und Steinhausen, W., Ueber die Abhangigkeit der Reflexzeit von der Stärke des Reizes. *Arch. f. d. ges. Physiol.*, 1921, **190**, 12–40.

Es wurden die Latenzzeiten in ihrer Abhängigkeit von der

Reizstärke bestimmt 1) bei Reflexpräparaten vom Frosch (bei chemischer, osmotischer und thermischer Reizung) 2) bei hemiplegischen Menschen (bei thermischem Reiz) 3) bei normalen Menschen und Menschen mit Hyperaesthesien (Head'sche Zonen, thermischer Reiz). Bei 1 und 2 wurden die Reflexzeiten, bei 3 die Zeiten bis zum Eintritt der Schmerzemfindung festgestellt. Die Latenzzeiten als Ordinaten zu den Reizstärken als Abszissen in ein Coordinatensystem eingetragen ergaben überall gegen beide Axen verschobene, gleichseitige Hyperbeln. Die eine Konstante ist in dem theoretischen Schwellenwert der Reizstärke zu suchen. Die Curven, welche am selben Menschen von normalen Hautstellen und von Head'schen Zonen gewonnen wurden, machen daher eine centrale Ursache wahrscheinlich. Die mathematischen sind gegeneinander verschoben und Ableitungen lassen sich nicht kurz referieren. BETHE (Frankfurt a/M.)

185. GELLHORN, E., Psychologische und Physiologische Untersuchungen über Uebung und Ermüdung. I. Mitteilung. *Arch. f. d. ges. Physiol.*, 1921, **189**, 144–173.

Die Uebungsfähigkeit bei geistiger Arbeit zeigt bestimmte Gesetzmässigkeiten. Die Aufgabe, den Buchstaben a im Text auszustreichen, ergab, dass die Mitübung die Kopfarbeiter zu quantitativ höherer Arbeitsleistung befähigt. Wird die Aufgabe der Berufstätigkeit des Kopfarbeiters ähnlicher, so wächst die Differenz zwischen Kopf- und Handarbeitern zunngunsten der letzteren. Mädchen stehen gleichaltrigen Knaben bezüglich Arbeitsmaxima und -minima nach. Die Form des Uebungsforrtschrittes lässt 3 Gruppen unterscheiden: Leicht ermüdbare Personen zeitigen Uebungsfortschritte zwischen den Versuchstagen; Gruppe 2 macht Fortschritte beim Versuch, Gruppe 3 beim Versuch und in den Pausen. Die Uebungsform (für jede Person charakteristisch!) tritt immer gleichartig in Erscheinung. Auf höheren Uebungsstufen nimmt die Ermüdung durch Wegfall der fördernden Uebungswirkung scheinbar zu. Der Grund für die Abnahme der Arbeimaxima und -minima bei Kopf- und Handarbeitern über 45 Jahre wird in arteriosklerotischen Circulationsstörungen des Gehirns oder regressiven Ganglienzellenveränderungen gesehen. Die Uebungsfestigkeit (individuelle Verschiedenheit! keine Alters- und Geschlechtsunterschiede!) ist gross. Nach 20 wöchiger Unterbrechung hat ein grosser Teil der Personen an Uebungswirkung nichts eingebüsst. Nicht ad maximum durchge-

führte Uebungsversuche können selbst nach solchen Pausen Zunahme der Arbeitsleistung aufweisen. Sinnesphysiologische Uebungsversuche (Unterschiedsschwelle des optischen Raumsinnes und der Bewegungsempfindungen) zeitigen schon nach wenigen Versuchen erhebliche Schwellenerniedrigungen. Auch hier grosse Uebungsfestigkeit und nach längeren Pausen eventuell weitere Schwellenverfeinerung.

HAPPEL (Frankfurt a/M.)

186. GELLHORN, E., Psychologische und Physiologische Untersuchungen über Uebung und Ermüdung. II. Mitteilung. Das Verhalten von Puls und Körpertemperatur im Zustande der Ermüdung. *Arch. f. d. ges. Physiol.*, 1921, **189**, 174–180.

Intensive körperliche und geistige Arbeit setzen Pulsfrequenz und Köpertemperatur nach der Schwere der Ermüdung durch die Arbeit herab. Nach Muskelarbeit wird die Temperaturverminderung, nach geistiger Arbeit die Pulsverlangsamung im Ermüdungsstadium grösser. Nach geringer geistiger Arbeit ist die Pulsverlangsamung noch deutlich vorhanden, wenn die Temperaturkurve bereits unverändert bleibt. Die Zeit der spontanen Rückbildung der Pulsfrequenz—und Temperaturherabsetzung nach Muskelarbeit geht der Grösse der geleisteten Arbeit parallel. Coffein beeinflusst das Ermüdungsgefühl nach geistiger Arbeit günstig, bewirkt keine Pulsfrequenzänderung dagegen geringe Erhöhung der Temperaturkurve. Da Atropin die Pulsverlangsamung nach geistiger Arbeit beseitigt, ist dieselbe durch Erhöhung des Vagustonus bedingt.

HAPPEL (Frankfurt a/M.)

187. HÜRTHLE, K., Beschreibung eines Kaukraftmessers. *Arch. f. d. ges. Physiol.*, 1921, **187**, 75–79.

Um seinen Apparat der innerhalb weiter Grenzen schwankenden Kaumuskelkraft (Kinder-Erwachsene-Kranke!) anzupassen, verwendet H. zwei Stahlfedern, deren eine leicht entfernbar ist. Bei der Messung der Kaukraft an den Schneide- und Backenzähnen wird auf 2 Beissleisten gebissen. Diese werden, wenn das ganze Gebiss zur Messung benutzt werden soll, durch 2 hufeisenförmige Löffel ersetzt. Die Verbiegung der Federn wird durch einen Hebel auf berusstes Papier mit fünffacher Vergrösserung übertragen. Durch jeden Biss wird die Schreibfläche um ca 1 mm

automatisch verschoben. Genauere Einrichtung des Apparates siehe Originalbeschreibung.

HAPPEL (Frankfurt a/M.)

188. IMMIG, G., Die Arbeitsprobe. *Praktische Psychol.*, 1921, 2, 338–344.

Die von I. beschriebene Eignungsprüfung enthält eine Drahtbiegearbeit als Arbeitsprobe, aus welcher Einblicke in die Geschicklichkeit des Anwärters zu nehmen sind. Sie soll ihm Gelegenheit geben, unbeeinflusst von irgend jemand in Ruhe seine natürliche Geschicklichkeit zu entfalten. Die Aufgabe ist leicht verständlich und lässt sich leicht auswerten. Nach ¾ resp. 1½ Jahren wurden Bewährungsproben gleicher Art von den Prüflingen genommen. Es ist eine gute Korrelation feststellbar zwischen Dauer der Lehrzeit, Anfertigungszeit, Materialverbrauch, Feinheit der Ausführung und Bewährung in der Lehre.

BOGEN (Berlin)

189. SPOONER, H. J., Health Problems Involved in Noise and Fatigue. *Nat. Health*, 1922, 4, 91–95.

The influence of noise, shock, and vibration—lacking periodicity—is wholly disorganizing, and the correction of badly balanced machinery and the obviation in civil and industrial life of the maddening, meaningless fanfare of sounds that sap our nervous reserves, becomes an urgent engineering problem, international in scope. Spooner, realizing the complexity of the general problem of noise, attempts to classify the primary kinds of noise that demand attention under four headings: road and rail traffic, industrial operations in which machinery is used, industrial operations in which machinery is not used, and streets and the home.

M. E. GALLAGHER (Pennsylvania)

6. ATTENTION, MEMORY AND THOUGHT

190. LAIRD, J., MOORE, G. E., BROAD, C. D., and HICKS, G. D., Symposium: The Character of Cognitive Acts. *Proc. Aristotelian Soc.*, 1920–21, 21, 124–160.

The question of the existence of cognitive acts is raised by Prof. Laird and discussed further by the second and third writers. Moore, also, attempts to determine the nature of a cognitive act.

J. H. SINCLAIR (Smith)

191. Dewey, J., An Analysis of Reflective Thought. *J. of Philos.*, 1922, **19**, 29–37.

The writer is grateful to Mr. Buermeyer for giving him the opportunity to explain his position on the process or steps of thought since former statements in How We Think may not have been clearly understood by some. The temporal sequence of the steps of thought is a matter of little importance. Mr. Buermeyer seems to obliterate distinction, induction and deduction. As it is, the former moves from facts to meaning, the latter is a development of meanings. This may not be clearly and adequately expressed in How We Think if we may judge by Mr. Buermeyer's criticism. However, the text of How We Think was especially concerned with making clear the difference between critical and uncritical thinking. It must be maintained that the occurrence in the mind of explanatory "causes" cannot be made to conform to stringent rules. We have no guarantee similar to the Aristotelian syllogism. Information about the problem is necessarily present but we often have a suggestion spring up apparently spontaneously. Knowledge may be knowledge in one context and the same content may represent hypothesis, or even error in another. To be skeptical as to the categorical value of an inductive inference is necessary to good thinking; a healthy skepticism is desirable. The function of deduction is elaboration of meanings at first crude and it is true that experimenting and deduction are involved in induction. The latter does not, however, involve logical identification. A careful consideration of psychological process makes this clear. T. R. Garth (Texas)

192. Sittig, O., Störung des Ziffernschreibens und Rechrens bei einem Hirnverletzten. *Monats. f. Psychiat. u. Neurol.*, 1921, **49**, 299–306.

Interessanter Fall von Rechenstörung, die weder als optisch noch als aphasisch zu deuten ist, sondern vom Verf, auf eine "Störung des Begriffs des Multiplizierens und Dividierens" zurückgeführt wird. Th. Ziehen (Halle)

193. v. Trotsenburg, J. A., Ueber Untersuchung von Handlungen. *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, **62**, 728–765.

Verf. hat die "Handlungen" in der Weise untersucht, dass die Vp. auf einen Gummiballon zu drücken hatte, der durch einen

Schlauch mit einem horizontalen Zeiger in Verbindung stand. Letzterer zeichnete auf einem Kymographion eine horizontale Linie auf. Die Vp. hatte ihren Druck so zu regulieren, dass der Zeiger weder stieg noch sank. 65 Kurven werden mitgeteilt. Sie illustrieren namentlich den Einfluss der affektiven Erregung, der Ermüdung und der Aufmerksamkeit. Sehr auffällig ist das Versagen im Kindesalter bis zum 12. Jahr.

Th. Ziehen (Halle a.S.)

194. Berliner, A., Bestimmung der Zuverlässigkeit bei der Methode der relativen Stellung mit besonderer Berücksichtigung der Werbeforschung. *Arch. f. d. ges. Psychol.*, 1921, **41**, 390–400.

Wird eine bestimmte Anzahl n von Objekten einer Gattung durch p Personen in je eine Rangordnung gebracht, so gehört zu den n *mittleren* Rangstufen ein Massihrer Variabilität in den p Ordnungen. Um dieses von der Zahl der Objekte unabhängig zu machen, wird es mit der maximalen Streuung bei völlig zufälliger Variation ohne auswählendes Princip dividiert, d. h. durch $\frac{1}{2}\sqrt{(n^2 - 1)/3}$. In analoger Weise ergiht sich dann die Variabilität der "Durchschnittsposition," also in der Richtung, die innerhalb der Tabelle über alle p.n Rangnummern zur vorigen Variationsrichtung senkrechten Diese wird an einem Beispiel erläutert.

W. Wirth (Leipzig)

195. Winzen, K., Die Abhängigkeit der paarweisen Assoziation von der Stellung des besser haftenden Gliedes. *Zeits. f. Psychol.*, 1921, **86**, 236–253.

"Wenn zwei Vorstellungen miteinander assoziiert werden sollen, und eine von beiden besser haftend ist als die andere, sei es, weil sie geläufiger ist, sei es, weil sie eindringlicher, so ist es für das vorteilhafter, wenn die besser haftende Vorstellung an erster Stelle, als wenn sie an zweiter Stelle kommt." Das hat besondere Bedeutung für die Anordnung von Wörterbüchern, Schulgrammatiken usw.

H. Henning (Frankfurt a/M.)

196. Baumgarten, F., Eine Konzentrationsprobe. *Praktische Psychol.*, 1921, **2**, 344–352.

Ein Blatt, auf dem in 20 Linien je 30 Ziffern aufgedruckt sind. Zu jeder vierten Zahl ist eine 3 zu addieren, von jeder folgenden

siebenten Zahl eine 2 zu subtrahieren. Der Test gestattet bei eingehender Analyse der Fehler die Festlegung des Arbeitstypus, z. B. gut und schnell; schnell aber schlecht; langsam aber gut; langsam und schlecht; teilweise schlecht, teilweise gut intermittierend arbeitend.

BOGEN (Berlin)

197. KLINE, L. W., An Experimental Study of Associative Inhibition. *J. of Exper. Psychol.*, 1921, 4, 270–299.

The present investigation was initiated in an attempt to discover the extent to which different degrees of strength within a meaningful associative bond facilitate or inhibit the association of one member of that bond to a new element. The names of a state and its capital, *e.g.*, were used as an original associative bond; that same state and a false capital furnished the components for a new association. Preliminary tests were conducted to determine the readiness of association between states and their capitals, and between works of literature and their authors. College and normal school students served as subjects.

The results bear witness to the fact that, in general, associative inhibition operates adversely in learning meaningful material. The inhibitory effect is least when the strength of the original association is small. On the other hand, inhibition is also slight when the recall power of the connecting bonds ranges between 75 and 100 per cent. In some cases strong association may facilitate learning in new contexts. Where the recall power is between 45 and 70 per cent, strength of inhibition is greatest. Below 40 per cent, and above 15 per cent, strength of inhibition is relatively small. Neurologically inhibition would seem to depend upon the readiness of discharge of the nerve centers involved; very strong and very weak associations facilitate, whereas intermediate degrees of associative strength inhibit relearning of meaningful material.

C. C. PRATT (Clark)

198. WELLS, F. L., KELLEY, C. M., and MURPHY, G., On Attention and Simple Reaction. *J. of Exper. Psychol.*, 1921, 4, 391–398.

Experiments of Breitwieser and Woodrow have shown that when *O* does not know what the duration of an interval between a warning signal and a stimulus for reaction will be, there seems

to be a narrow zone within which "attention" is relatively higher than for other prestimulus intervals. That is to say, the shortest reaction times occur in the interval from two to four seconds, with a leaning towards two. These findings are supported by the present experiments in which the prestimulus intervals, unknown to *O*, were kept approximately at one second or three seconds. A comparison ratio of the reaction times under these two intervals reveals a general tendency to favor the three-second interval: the one-second interval, arguing from the work of the previous investigators, is ahead of the most favored interval, while the three-second interval is right in the most favored zone.

C. C. Pratt (Clark)

199. Robinson, E. S., The Relative Efficiencies of Distributed and Concentrated Study in Memorizing. *J. of Exper. Psychol.*, 1921, 4, 327–343.

The present study was undertaken in order to determine the relative efficiency of concentrating all practice or study in learning into one sitting as compared with dividing it into smaller units indulged in at varying intervals of time. The learning material consisted of three-place numbers exposed for 2 seconds each in series of ten. The experiment was divided into two parts with six variable conditions in each part. The variations in the first part were brought about in the following manner: 3 trials in which learning was concentrated into 12 presentations at one sitting, followed respectively by 5 and 20 minute, and 24 hour intervals before recall; and 3 trials in which learning was distributed over two series, separated by 24 hours, of 6 presentations each, followed by 5 and 20 minute, and 24 hour intervals before recall. In the second part of the experiment, 6 presentations were used for concentrated learning and 3 for distributed. Otherwise conditions were similar to those of part 1. The total number of digits recalled, the correct digits recalled, and the time for recall were recorded as indices of amount of learning.

The results of these tests are by no means univocal. It may be said in general, however, that distributed learning is superior when an end is put to practice after something more than 3 presentations (experiment 1). From which it would follow that concentrated learning is superior when the practice periods for distributed learning do not contain more than 3 presentations (experiment 2). Scoring by means of *correct digits recalled* and *time*

of recall reveals a greater advantage for distributed study than *amount of recall.* "The relative merits of distributed and concentrated study of numerical material depend upon: (1) the total amount of study considered, (2) the units into which that material is divided, (3) the stage in the foregoing process at which memorial efficiency is tested, and (4) the criterion of efficiency employed; *e.g.*, amount, accuracy, or time of recall." C. C. PRATT (Clark)

7. SOCIAL FUNCTIONS OF THE INDIVIDUAL

200. HANKE, W., Ueber aphasische und optisch-räumliche Störungen. *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, 63, 167–209.

Die Verfasserin teilt zwei sehr interessante zur Sektion gekommene Fälle ausführlich mit. Für den Psychologen bringt namentlich der Untersuchungsbefund bezüglich der optisch-räumlichen Leistungen manches Neue.

TH. ZIEHEN (Halle a.S.)

201. BERLINER, A., Zusammenhang zwischen ästhetischem Wert und Wiedererkennen. *Arch. f. d. ges. Psychol.*, 1921, 41, 401–410.

Sieben Gruppen von Versuchspersonen ordneten Postkarten nach ihrer Gefälligkeit. Dann wurde die Häufigkeit des Vergessens jeder Karte für die einzelenen Gruppen festgestellt. Die grossen Unterschiede zwischen der Korrelation beider Gesichtspunkte in den 7 Gruppen (r zwischen 0,18 und 0,73) erklären sich daraus, dass ein hoher K. Koefficient eine ausgesprochene ästhetische Difierenzierung der einzelnen Karten für die betreffende Gruppe voraussetzt. Verf. kontrolliert dies an der Hand der Variation der "Durchschnittspositionen" deren Extreme in der Tat denenvonr entsprechen. W. WIRTH (Leipzig)

202. MOEDE, W., Ergebnisse der industriellen Psychotechnik. *Praktische Psychol.*, 1921, 2, 289–328.

Ausführlichere Darstellung der Methoden der Eignungsprüfung des Laboratoriums der technischen Hochschule Charlottenburg. Zu Beginn aller Arbeit sind durch Fragebogen und wissenschaftliche Arbeitsstudien die Berufsverrichtungen festzustellen. Die psychologische Analyse stellt dann die Fähigkeiten fest und durch

planmässig zu variierenden Versuch die Bedeutung der Einzelfunktion im Verrichtungskomplex. Danach folgen die Trennung der Funktionen in übbare und nicht übbare, die Proben auf Erfassungsmöglichkeit und Sicherneit der Erfassung. Für das Prüfverfahren führt der Grundsatz der begrenzten Zerlegung der Berufsfunktion am ehesten zum Ziel. Das Prüfverfahren zeigt im wesentlichen drei Formen: eichfähig gemachte Wirklichkeit, Schema der Wirklichkeit und abstraktes Prüfverfahren. Weiterhin werden die notwendigen Eichungsverfahren in ihrem Nacheinander und der Modus der Prüfung selbst beschrieben. Zum Schluss sind korrelationsstatistische Ergebnisse, Erfolgskontrollen und Bewährungsstatistiken über verschiedene Berufe angegeben.

BOGEN (Berlin)

203. HIRSCH, A., Einstellung und Ausbildung kaufmännischer Lehrlinge bei der Osramgesellschaft. *Praktische Psychol.*, 1921, **2**, 329–332.

Die Gesellschaft geht von dem Gedanken aus, dass es Zweck der Lehrlingsausbildung ist, den Nachwuchs für die leitenden Stellen des Unternehmens heranzubilden. Erfüllen die Bewerber gewisse Anforderungen in Bezug auf Vorbildung und Lebensführung, so werden sie zur psychotechnischen Eignungsprüfung zugelassen. Sie erstreckt sich auf Gedächtnis, Urteilsfähigkeit, Begriffsbildung und Kombinationsfähigkeit. Während der Ausbildungszeit, in der die Anwärter alle wichtigeren Abteilungen kennen lernen, werden die Prüfungen im Zwischenraum von 9 Monaten wiederholt. Die Feststellung besonderer Minderleistungen in einer psychischen Funktion führt dann zu spezialisierter Ausbildung in dem unterwertigeren Fähigkeitsbereich. BOGEN (Berlin)

204. OLIVIER, Rationalisierung im Fernsprechbetriebe. *Praktische Psychol.*, 1921, **2**, 332–338.

Durch Anlage der Schalttafeln nach psychotechnischen Gesichtspunkten war es gelungen, die Zuverlässigkeit und Leistung im Schaltbetriebe zu steigern. Nunmehr wurde in eine systematische Schulung der Beamtinnen auf die Neueinrichtungen eingetreten, um weitere Leistungserhöhung und gleichzeitig Arbeitsentlastung durchzuführen. Das Ergebnis bestand in einer Leistungssteigerung von 40 per cent im Mittel. Ferner vollzog sich eine Angleichung in den Leistungen, sodass an Stelle von 15 Gütegruppen

mit 8–22 Verbindungen in der Minute nur noch 3 Gruppen mit 20–22 Verbindungen zu unterscheiden waren.

BOGEN (Berlin)

205. HISCHE, W., Erfahrungen des kommunalen psychologischen Instituts zu Hannover. *Praktische Psychol.*, 1921, 3, 44–54.

Das Institut hat die Aufgabe, den durch die Zielstellungen "Einheitsschule" und "Berufsberatung" gegebenen psychologischen Augaben gerecht zu werden. In enger Zusammeharbeitmit der Schule arbeitet es an der Auslese der Schwachsinnigen und besonders Befähigten, wobei die kombinierte psychographisch-experimentelle Methode Anwendung findet. Die Arbeit erstreckt sich ferner auf die Grundlegung einer psychologischen Pädagogik. Der Berufsberatung soll durch jährlich durchzuführende Psychologische Prüfung ein Entwicklungsbildd der Kinder dienen. Dabei kommt die Festlegung des Eignungsschwerpunktes besonders den der Berufswahl ratlos gegenüberstehenden und den umzustellenden Erwerbslosen zu gute.

BOGEN (Berlin)

206. SCHRÖTELER, J., Die Fremdbeobachtung in der religionspsychologischen Kinderforschung. *Zeits. f. päd. Psychol.*, 1921, 22, 218–234.

Die reine Beobachtungsmethode und die Erhebungsmethode, soweit sie auf die religionspsychologische Kinderforschung Anwendung gefunden haben, werden einer eingehenden Kritik unterzogen. Die Beobachtung kann bei Berücksichtigung aller Vorsichtsmassregeln wertvolle Dienste leisten. Ihr Ergebnis wird jedoch immer nur Annäherunswert besitzen. Die Erhebungsmethode als *die* Methode der religionspsychologischen Forschung ansehen, bedeutet eine Überschätzung der Statistik und eine Unterschätzung ihrer Schwierigkeiten. Unter Beachtung aller Einschränkungen kann sie der ersten Methode eine wertvolle Ergänzung sein. Verfasser berücksichtigt alle einschlägigen deutschen Arbeiten. Als Forschungsziele werden angegeben: Das Wesen des Religiösen, Der Bewusstseinsinhalt den Kindes als Ganzes, die Objekte kindlichen Denkens und Fühlens und die einzelnen seelischen Akte, der Ursprung des Bewusstseinsinhaltes.

BOGEN (Berlin)

207. SCHÄFER, P., Die kindliche Entwicklungsperiode des reinen Sprachverständnisses nach ihrer Abgrenzung. *Zeits. f. päd. Psychol.*, 1921, **22**, 317–325.

Versucht eine Abgrenzung der Periode zu geben, in der vom Kinde selbstgesprochene Worte noch fehlen, Verständnisbewegungen aber bereits auftreten. Zu dem Zweck werden alle einschlägigen Beobachtungen aus wissenschaftlichen Kindermonographien sowie eigene Beobachtungen des Verfassers zusammengestellt. Eine Abgrenzung nach unten hin ist nicht mit Sicherheit zu geben. Ihre durch schnittliche Dauer ist auf 3 Monate anzunehmen. Hierbei ist zu beachten, dass der Beginn der Entwicklung speriode etwas zeitiger liegt, als die ersten Verständnisbewegungen sich zeigen, und dass sie später endet als bei dem Auftreten sprachlicher Dressurleistungen.

BOGEN (Berlin)

208. SCHREIBER, Das Prüflaboratorium für Berufseignung bei der Eisenbahn-General-Direktion Dresden. *Praktische Psychologie*, 1921, **2**, 232–239.

Kurze Beschreibung von Prüfraum und-einrichtungen für den Lokomotivführerdienst zur Prüfung der Willensstärke und Ermüdbarkeit, der Dauerhaftigkeit des Merkens bei störenden auch einzuprägenden Wahrnehmungen, der Fähigkeit zu Geschwindigkeitsschätzungen, des Raumgedächtnisses und der Entschlussfähigkeit. Ferner eine Auseinandersetzung mit der an den Eignungsprüfungen für Verkehrsberufe geübten Kritik.

BOGEN (Berlin)

209. TRAMM, K. A., Psychotechnik und Wirtschaftlichkeit im Strassenbahnwesen. Betriebsstatistische Belege zwischen menschlicher Arbeitsleistung, Energie- und Materialverbrauch sowie Betriebssicherheit. *Praktische Psychol.*, 1921, **2**, 357–361.

Der Stromverbrauch wird massgebend beeinflusst durch die menschliche Arbeitsweise, Belehrung und Überwachung. Rationelle Menschenauswahl und Erziehung ermöglichte eine Stromersparnis von 8–25 per cent. Die Strassenbahnunfälle liessen sich um 30–165 per cent vermindern und unterschritten damit die günstigsten Jahre vor dem Kriege.

BOGEN (Berlin)

210. Berufseignungsprüfung in der elektrotechnischen Fabrik Rheydt, Max Schorsch & Co., Rheydt. Bericht der Werkschulleitung. *Praktische Psychol.*, 1921, 2, 289–328.

Betrifft Auslese von Metallarbeiterlehrlingen, Geprüft werden Tastempfindlichkeit der Fingerspitzen, Gelenkempfindung, Sehschärfe, Augenmass, anschauliche Kombination, Raumlagegedächtnis, technisches Verständnis, Geschicklichkeit. In allen Prüfungen muss mindestens Genügendes geleistet sein. Nicht genügende Leistungen können durch bessere andern Funktionen nicht kompensiert werden.

BOGEN (Berlin)

211. HAMBURGER, Einfluss der Wiederholungg eines psychotechnischen Prüfungsversuchs auf das Prüfungsergebnis. *Praktische Psychol.*, 1921, 3, 54–61.

Versuche, die der Beantwortung der Frage dienen sollen, ob die bei der Eignungs prüfung gewonnene Rangreihe sich unter dem Einfluss längerer Übung konstant erhält. Die Übungsversuche bestanden a) in der Einprägung eines Gewichtes, b) eines Winkels, c) eines Taktschlages und d) eines Tones; 2. in einer Übung der Zusammenarbeit beider Hände, 3. in einem Durchstreich- (cancellation) Test und 4. in einer Arbeitsprobe. Stärkere Rangreihenkonstanz von 60–70 per cent zeigten nur die Proben c, 2; und 3. Eine absolut straffe Aufrechterhaltung der Rangreihe besteht nirgends. Es muss darum bei jedem psychotechnischen Prüfverfahren der Grad seiner Konstanz ermittelt werden. Tägliche Schwankungen der Disposition legen die Forderung nahe, die Prüfung auf mehrere Tage zu verteilen.

BOGEN (Berlin)

212. MENZEL, M., Beiträge zur Psychotechnik Schreibmaschine und ihrer Bedienung. I. Vergleichende Methodik und Didaktik des Maschineschreibens auf experimenteller Grundlage. *Praktische Psychol.*, 1921, 2, 269–274.

Die gesamte Schreibleistung von 24 anzulernenden Blindschreibern und 12 Sehendschreibern in 160 Schreibstunden wird verglichen und zwar A) das Schreiben des gleichen Satzes in allen Übungsstunden und B) das Schreiben von vorgelegten Übungstexten. Die Unterlegenheit der Schendschreiber bei der praktischen Arbeit ist schon während der Anlernzeit deutlich bemerkbar.

Sie weisen auch den grösseren Verlust bei Übungspausen auf. Ein Zusammendrängen des Unterrichts auf kurze Zeit ist dringend zu empfehlen. Versuche über Schreibfähigkeit der Hände zeigen eine bedeutende Unterlegenheit der rechten Hand. Nicht zu häufiger Handwechsel erzielt höhere Leistungen als sehr häufiger resp. als einhändiges Schreiben.

BOGEN (Berlin)

8. SPECIAL MENTAL CONDITIONS

213. GALANT, S., Warüm muss der Traum ein Wunschtraum sein? *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, **63**, 210–214.

Enthält nur kurze Bemerkungen zu Gunsten der Aufassung, dass a l l e Träume, auch die "im Schlaf reflektorisch auftretenden Tagesreste" der intellektuellen Arbeit des Wachzustandes nichts anders als Wünsche sind.

TH. ZIEHEN (Halle)

214. SCHULTZ, J. H., Ueber Schichtenbildung im hypnotischen Selbstbeobachten. *Monats. f. Psychiat. u. Neurol.*, 1921, **49**, 137–143.

Verf. glaubt bei optischer Einstellung drei Schichten in der Hypnose unterscheiden zu körnen: 1. optisches Vormaterial (amorphe Schicht) = formloses Eigenerleben. 2. visualisiertes Denken = intellektuelisiertes Eigenerleben. 3. plastisch-leibhaftige Fremderlebnisse (Primitivschicht).

TH. ZIEHEN (Halle)

215. EICHELBUG, Durch Hypnose erzeugtes "hysterisches Fieber." *Zeits. f. Nervenheilkunde*, 1921, **68–69**, 352–356.

Bei einer 30jährigen Hysterischen wurde ein hysterisches Fieber (richtiger hyst. Hyperthermie) von 38,7° (rektal) durch Suggestion in Hypnose beseitigt und andrerseits später zweimal durch hypnotische Suggestion Temperaturerscheinung hervorgerufen. Bei dem zweiten Versuch stieg die Temperatur z.B. 15 Minuten nach erteilter Suggestion von 37,4° auf 39,2°. Das Maximum war 25 Minuten nach der Suggestion erreicht. Durch Gegensuggestion fiel dann die Temperatur binnen 7 Minuten von 39,2° auf 37,5° zurück. Bei dem Steigen der Temperatur trat

Gesichtsblässe auf, bei dem Fallen Rötung und Schweissausbruch. Der Puls zeigte beim Anstieg keine nennenswerte Veränderung, beschleunigte sich aber beim Abfall für sehr kurze Zeit von 84 auf 110. *Die Temperatur wurde vom Verf. selbst gemessen.*

TH. ZIEHEN (Halle a.S.)

9. NERVOUS AND MENTAL DISORDERS

216. GEORGI, F., Beiträge zur Kenntnis des psychogalvanischen Phänomens. *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, 62, 571–597.

In einem Fall von vollständigem angeborenen Mangel der Schweissdrüsen bei einem elfjährigen Knaben konnte ein psychogalvanischer Ausschlag nicht festgestellt werden. Der Kontaktschlusskurventeil verändert sich je nach dem Verhältnis der Körpertemperatur zur Elektrodenflüssigkeit, in dem Fall von Schweissdrüsenmangel ist der Kontaktschlussauschlag stets niedriger als normal. Eine z.B. durch Schwitzbad verstärkte Schweissekretion beeinflusst bei normalen Personen das Phänomen selbst nicht, dagegen vergrössert sie infolge der allgemeinen Widerstandsverminderung die Kontaktschlusskurve (sehr deutlich auch bei Hemihyperhidrosis). Verf. schliesst daher gegen Pieron und H. Müller, dass das psychogalvanische Phänomen im Wesentlichen durch äusserst feine, affektiv ausgelöste, nur elektrisch feststellbare Schweissdrüsensekretionen determiniert wird.

Im zweiten Teil der Arbeit teilt der Verf. mit, dass bei einer schwer hysterischen Versuchsperson in der Hypnose Nadelstiche, die auf den Arm appliziert wurden, zu keinen Galvanometerschwankungen führten, dagegen lösten akustische Reize nach ungewöhnlich langer Latenzzeit einen unzweideutigen, allerdings relativ kleinen Ausschlag aus. Der negative Ausfall der Versuche mit Schmerzreizen im Armgebiet erklärt sich wahrscheinlich daraus, dass in häufigen früheren Hypnosen Anästhesie für Stiche im Armgebiet suggeriert worden war. In der Tat ergab sich bei taktilen Reizungen in einem andern Körpergebiet (Wade) ein bis auf die meist verlängerte Latenzzeit normaler Ausschlag, und dieser konnte durch Suggestion auch hier aufgehoben werden. Es scheint also, dass die unterbewusste bleibende Reizung den Organismus nicht affektiv erregt.

TH. ZIEHEN (Halle)

217. Beck, D. J., Zwang und Depression. *Monats. f. Psychiat. u. Neurol.*, 1920, **48**, 273–300.

Verf. erörtert die Beziehung des obsessiven Zustände, die er auf ein Syndrom im Sinn des caractère scrupuleux-inquiet französischer Autoren (Sankhanoff) zurückführen will, zur depressiven Konstitution.

Th. Ziehen (Halle)

218. Stanojevic, L., Beitrag zur Lokalisation der bilateralen Apraxie der Gesichts- und Sprachmuskulatur auf Grund eines längere Zeit beobachteten Falles. *Monats. f. Psychiat. u. Neurol.*, 1920, **48**, 301–306.

Der klinische Untersuchungsbefund wird nur dehr kurz mitgeteilt; Sektionsbefund fehlt.

Th. Ziehen (Halle)

219. Künkel, F. W., Die Kindheitsentwicklung der Schizophrenen. *Monats. f. Psychiat. u. Neurol.*, 1920, **48**, 254–272.

Verf. hat die Kindheitsentwicklung von 103 sicheren Fällen von Schizophrenie (Dementia praecox) festgestellt. Bei 6/7 waren psychopathische Eigentümlichkeiten in der Kindheit nachzuweisen, und zwar glaubt Verf. mit Kräpelin 4 Syndrome unterscheiden zu können, die bald einzeln, bald kombiniert die Kindheit der Schizophrenen charakterisieren: autistisches, reizbares, asoziales und pedantisches Syndrom. Das Gemeinsame dieser Störungen scheint darin zu liegen, dass die normale Wechselwirkung zwischen Antrieb und Gegenantrieb entweder garnicht oder nur langsam und unvollständig zur Geltung kommt ("Steifigkeit" der Affekte). K. fasst sie als "erstes Stadium" der Krankheit auf und sucht daher den Beginn der Schizophrenie vielleicht schon im intrauterinen Leben.

Th. Ziehen (Halle)

220. Schroeder, P., Ueber die Halluzinose und vom Halluzinieren. *Monats. f. Psychiat. u. Neurol.*, 1921, **49**, 189–220.

Einzelne interessante Beobachtungen von Sinnestäuschungen mit psychopathologischen Erklärungsversuchen.

Th. Ziehen (Halle)

221. SANTANGELO, G., Untersuchungen über die Physiologie und Pathologie der stereognostischen und symbolischen Wahrnehmung der Gegenstände. *Monats. f. Psychiat. u. Neurol.*, 1921, **49**, 229–250.

Bemerkenswert sind die Untersuchungen über die stereognostische Sensibilität der Fusssohle, des Handtellers und des Rückens. Die Ergebnisse stimmen im wesentlichen mit denjenigen von Morton Prince (1908) überein. Zwischen der rechten und linken Körperhälfte besteht kein nachweisbarer Unterschied.

TH. ZIEHEN (Halle)

222. DRÄSEKE, J., Ueber Mitbewegungen bei Gesunden. *Zeits. f. Nervenheilkunde*, 1921, **68–69**, 344–351.

Verf. beschreibt als neue Mitbewegung bei normalen Schulkindern eine ausgeprägte, ziemlich oft asymmetrische Spreizung der Finger beim Oeffnen des Mundes.

TH. ZIEHEN (Halle a.S.)

223. KLIENEBERGER, O., Zur Frage der Homosexualität. *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, **63**, 129–148.

Durch eine genauere Analyse zweier interessanter Fälle, die zunächst durchaus das Bild angeborener Homosexualität darboten, zeigt Verf., dass der erworbene Charakter doch keineswegs ausgeschlossen werden kann. Insbesondere bezweifelt Verf. auch, dass, wie Näcke dies behauptet hat, aus dem ausschliesslich homosexuellen Charakter der Träume mit Sicherheit auf Homosexualität geschlossen werden könne.

TH. ZIEHEN (Halle a.S.)

224. FRANK, C., Die Störungen des Vibrationsgefühle bei den traumatischen Verletzungen der peripheren Nervenstämme. *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, **62**, 627–727.

Verf. schliesst aus seinen Beobachtungen, dass die Pallästhesie eine besondere, von allen anderen unabhängige Form der Tiffensensibilität ist und durch besondere Periostnerven von wahrscheinlich spezifischer Funktion geleitet wird. Ihre Bahnen sollen nicht im sensiblen, sondern im motorischen "Kabel" des peripherischen Nervenstamms verlaufen und auch weiterhin in die Vorderhörner gelangen und die Pyramidenseitenstrangbahn ungekreuzt begleiten.

TH. ZIEHEN (Halle a.S.)

225. WEYGANDT, W., Der Geisteszustand bei Turmschädel. *Zeits. f. Nervenheilkunde*, 1921, **68–69**, 495–510.

8 zum Teil interessante Fälle psychischer Veränderungen (Schwachsinn, degenerative Züge, psychotische Symptome) werden kurz mitgeteilt.

TH. ZIEHEN (Halle a.S.)

10. INDIVIDUAL, RACIAL AND SOCIAL PSYCHOLOGY

226. JOHNSTONE, E. R., Annual Report of the Director of the Training School, Vineland, N. J. *Training Sch. Bull.*, 1921, **8**, 65–74.

The Board of Directors has become a Board of Trustees; the Superintendent has been made Director; the Assistant Superintendent is now Superintendent. The Director has general oversight and direction of the institution and is responsible for the work of the Colony, Research and Extension, and all special questions of education and finance. The Superintendent is responsible for the mass of details covering the daily life of the children including the training, entertainment, health, food, clothing and occupation.

At the request of the Commission of Institutions and Agencies of New Jersey the Trustees of Vineland Training School loaned the Director, part time, to aid in the development of the divisions of Classification, Education, Parole and Domestic Relations of the State Department of Institutions and Agencies. In this way the school coöperated with the State.

The work of the Training School is divided into the following activities: (1) Colonies, (2) Business, (3) Education, (4) Research, (5) Extension. In each the Training School has made progress during the year which the report covers.

E. MULHALL ACHILLES (Columbia)

227. ANON., Letters to Robinson on Institutional Affairs: Summer School (ninth letter on institutional matters). *Training Sch. Bull.*, 1921, **8**, 75–80.

A description of the summer school at the Training School in Vineland, N. J.

E. MULHALL ACHILLES (Columbia)

228. HEALY, M., The Practical Value of the Scientific Study of Juvenile Delinquents: Children's Bureau, *U. S. Dept. of Labor. Publication* No. 96, 1922, 31 pages.

The Juvenile Court is the *individualization* both of *understanding* and of treatment. The Court functions on the concept that it is during the youthful, formative period of life that tendencies toward social misbehavior begin, and that this is the time of times in which to gain understanding of causes and beginnings, and is the time in which to thwart such warpings of character and habit. Crime costs in this country some three or four million dollars a day and hundreds of thousands of persons are sentenced annually. The Juvenile Court with its possible hold upon many beginnings is in the most strategic position for reducing this vast blot on social life. The manifold practical issues that are intrinsic in Juvenile Court cases not only justify by their importance careful case study, but make it an absolute necessity, if exceedingly significant conditions are not to be overlooked. The practical aspects of delinquency really are manifold, but knowledge of causation and carrying out a diversity of treatment is thoroughly practicable. Classification of "intelligence levels" or "mental ages" and other ready-to-wear classification is not sufficient. It is also necessary to know the individual's habit of mind and body, the forces which are behind him, his motivating experiences, his reaction to his environment, his ideation as related to delinquency, causation in the environment itself, and the special resources of body and mind that can be used for re-educative treatment. The everyday knowledge of the quantity of the forces operating from within and without must be carefully studied. Adequate practical study means finding all the influences at work in the individual, life influences remaining from early childhood, causes referable to family conditions, hidden bad habits, etc. These influences are interwoven, and it is rarely that any factor can be selected as the sole cause of delinquency. There is a general relation between delinquency and mental life. Many elements and conditions of mental life are concerned in the product of mental activity which we call social behavior. The only means of knowing the forces operative in a given case is through study of the mental life, the definite directive agent of conduct. At present the most generally recognized function of scientific study of delinquents is a determination of mentality in terms of normality or feeblemindedness. In a recent study made by the Judge Baker Foundation, the

proportion of defectives among delinquents was found to be 22 per cent. Among these the clearly feebleminded constituted 12 per cent of the whole number, the aberrational cases being about 2 per cent. Other figures presented in graphic form show a wide range of mental ability among the delinquents. The study of the whole, however, shows that there is a much larger proportion of defectives as they appear in court than in the general population. But since it is well known that some individuals of limited mentality maintain themselves without misbehavior, even a defective individual cannot be considered apart from any special capacity which he may have, or apart from formative experiences and the influence of his given environment. Mental age or I.Q. do not offer a complete guide to prognosis and treatment of delinquency in any case. A list of the categories of qualities and elements of mental life that in practical studies of delinquents have been found to have to do with conduct include *mental capacities*, *mental balance*, *the dynamic qualities of mental life*, *personality characteristics*, *the characteristics of the individual's group*, *mental content*, *mental experiences plus expressions*, *mental habit*, *general mental attitude and the mental impulsions*. Because mental life stands directly back of conduct the best diagnosis in any instance of delinquency arises from consideration of the situation in terms of the mental life given above. Knowing these mental elements, a much fairer estimate of the outside factors may be made. Cessation of the delinquency is the desideratum and in the attainment of this aim all the factors complicated in the delinquency and in the cure, mental and environmental, must be carefully weighed. The greatest need of Juvenile Courts are those things which make for practical success in the job at hand—alteration of conduct tendencies. The scientific spirit introduced into the Juvenile Court will ennoble the whole procedure; it will make the work more intelligent, more calculable; it will aid sympathy to be more productive of good results. M. S. Viteles (Pennsylvania)

11. MENTAL DEVELOPMENT IN MAN

229. Klemm, O., Ueber die Korrelation verschiedenartiger Auffassungsleistungen bei Eignungprüfungen. *Arch. f. d. ges. Psychol.*, 1922, 42, 79–90.

Bei Eignungsprüfungen, in denen die zuverlässige Auffassung und Wiedergabe von Sinneswahrnehmungen eine besondere Rolle

spielte, wurde die Auffassung tachistoskopisch dargebotener Objekte, also der sogenannte Aufmerksamkeitsumfang, der Umfang des unmittelbaren Behaltens, das Zählen unregelmässiger Punktmengen und das fortlaufende Ablesen von Farben und Farbennamen an einer grosse Anzahl von Teilnehmern in vergleichbarer Weise geprüft. Die beiden ersten Leistungen wiesen durchweg eine hohe, die beiden letzteren dagegen so gut wie keine Korrelation auf. Wohl aber erwies sich hierbei die Korrelationsbetrachtung für eine Analyse der Einzelleistungen, z. B. Zählfehler und Zählzeit, nützlich.

O. Klemm (Leipzig)

230. Piorkowski, C., Die Ergebnisse der Intelligenzprüfung und die pädagogische Praxis. *Praktische Psychol.*, 1921, 2, 219–222.

Beim Vergleich Ergebnisse von Begabungsprüfungen zeigt sich die gleiche Erfahrung an verschiedenen Orten Deutschlands. Die Schüler, die in der psychologischen Prüfung gut abschnitten, rechtfertigten die in sie gesetze ten Erwartungen. Die Versager liegen in der Hauptsache bei den mit nur genügenden Leistungen, unter diesen auch bei solchen, die von der vorschlagenden Schule besonders empfohlen worden sind. Bogen (Berlin)

231. Immig, G., Die Eignungsprüfung für Lehrlinge bei der Firma Carl Zeiss, Jena. *Praktische Psychol.*, 1921, 2, 225–231.

Ausgewählt werden Mechaniker, Werkzeugschlosser, Maschinenschlosser, Optiker, Die Massenprüfung erstreckt sich auf allgemeine und praktische Intelligenz, räumliche Vorstellungsfähigkeit, geistige Konzentration, Zuverlässigkeit und Findigkeit. In der Einzelprüfung werden Sinnestüchtigkeit, Geschicklichkeit, technisches Verständnis, Kombination, Beobachtungsgabe, Willensleistung und Ermüdbarkeit geprüft. Hervorzuheben ist eine Drahtbiegearbeit nach Vorlage zur Erprobung der praktischen Arbeitsleistung. Erfolgskontrolle ist beigefügt. Bogen (Berlin)

232. Malsch, F., Das Interesse für die Unterrichtsfächer an höheren Knabenschulen. *Zeits. f. päd. Psychol.*, 1921, 22, 234–248.

Eine Erhebung an 320 Schülern. Frage: Für welche beiden Fächer habt ihr das grösste, für welche das geringste Interesse?

Für die mathematisch-naturwissenschaftlichen Fächer herrscht vorwiegend positives durchschnittliches Interesse, das mit steigendem Lebensalter steigende Tendenz zeigt. Die Ursache für dürfte in der Eigentätigkeit liegen, der diese Fächer Raum geben, zum Teil auch in dem Milieu (Industrierevier), aus dem die Schüler stammen. Die Sprachen erregen in der unteren Klassen starkes Interesse, das mit wachsendem Alter ständig absinkt und in den Oberklassen in Ablehnung umschlägt. Solange der Schüler vorwiegend reproductiv arbeitet, sind die Sprachen positiv bewertet, je mehr Fähigkeit und Wille zur Selbsttätigkeit erwachen, ist das Gegenteil der Fall.

BOGEN (Berlin)

233. SCHUMANN, P., Aus den Anfängen der Kinderpsychologie. *Zeits. f. päd. Psychol.*, 1921, **22**, 209–218.

Teilt eine der ältesten Monographien über ein sehr frühreifes Kind (Kästner-Kirsten, Johann Gotthold Kirsten) aus dem Jahre 1796 im Auszug mit und Dietrich Tiedemanns "Beobachtungen über die Entwicklung der Seelerfähigkeiten bei Kindern" 1787.

BOGEN (Berlin)

234. HUTH, A., Förderung der Begabten durch Gruppenunterricht. *Deutsche Schule*, 1921, **25**, 152–161.

Neben der Auslese der Hochbefähigten und Schwachsinnigen aus der Normalschule hat die besondere Förderung der verschiedenen Begabungsgrade in der Normalklasse einherzugehen. Zu diesem Zweck sind die Schüler nach dem Grade der psychophysischen Gesamt entwicklung in Gruppen zu sondern. Die Methode der Differenzierung ist den bekannten Auslesemethoden zu entlehnen. Sie stellt fest: anatomischen und physiologischen Entwicklungsstandpunkt, Umwelt, Schul- und Lebenskenntnisse, intellektuelle, emotionale und moralische Entwicklung.

BOGEN (Berlin)

235. RUSSO, C., Alfred Adlers Pädagogik auf Grundlage seiner "vergleichenden Individualpsychologie." *Zeits. f. päd. Psychol.*, 1921, **22**, 355–369.

Der Mensch erstrebt ein fiktives Endziel. Kinderpsychologisch-genetisch betrachtet geht das Endziel- die All-überlegenheit-hervor aus den Minderwertigkeitsgefühlen, die im Kind aus seiner

Stellung zum Erwachsenen entstehen. In der Gemeinschaft der Gleichwertigen bildet das Kind das Gemeinschaftsgefühl aus. Das Streben nach Macht ist dort am stärksten, wo die Anpassung am schwersten fällt, z.B. in Fällen von Organminderwertigkeit. Das Bewusstsein der Minderwertigkeit zeitigt den "männlichen Protest," der sich in verschieden umgrenzbaren Typen asozial ausleben kann. Jeder Erzieher hat es zu vermeiden, das kindliche Minderwertigkeitsgefühl zu vertiefen. BOGEN (Berlin)

236. BONDY, C., Methodische Hilfsmittel zur Psychographie von Jugendorganisationen. *Zeits. f. päd. Psychol.*, 1921, **22**, 369–375.

B. hat sich die Aufgabe gestellt, der deutschen Jugendbewegung auf wissenschaftlichem Wege beizukommen, um so das noch wenig bekannte Gebiet der Psychologie des Jugendlichen zu bereichern. Er verwendet dabei neben der unwissenschaftlichen extrospektiven Methode und der nicht—experimentellen Beobachtung die qualitative und quantitative Erhebungsmethode. Zur ersteren bildet die Fragebogenausfüllung durch den Jugendlichen die Quelle, zur zweiten die Bearbeitung einer Statistik durch den Leiter der Jugendgruppe. Hinzu kommt noch die historische Methode, die sich auf die Bearbeitung der literarischen und anderer Produkte des Jugendlichen wirft. BOGEN (Berlin)

237. STERN, W., Zur Psychographie der proletarischen Jugendbewegung. (Auf Grund von Untersuchungen von Curt Bondy.) *Zeits. f. päd. Psychol.*, 1921, **22**, 376–379.

Der proletarischen Jugendbewegung ist mit der bürgerlichen gemeinsam die Sehnsucht nach einem neuen Menschentum, der Glaube, dass die Jugend von sich aus berufen und imstande sei, die Menschen aus Autorität und Tradition zu erlösen. Ihre Zielstellung liegt in der Ideologie des Sozialismus, wobei allerdings keine Bindung an eine Partei ihnen Fessel anlegt. Vom Antifeminismus der bürgerlichen Bewegung ist die proletarische frei.

BOGEN (Berlin)

238. ENGELMANN, S., Der deutsche Aufsatz im Dienste der Begabungsforschung. *Zeits. f. päd. Psychol.*, 1921, **22**, 379–383.

In mehrjährigen Versuchen an 12–16 jährigen Schülerinnen einer höheren Lehranstalt haben sich drei Formen des Aufsatzes

(composition) als für die Begabungsdiagnose besonders aufschlussreich erwiesen. Das Wiedererzählen und zu Endeführen eines nicht bis zum Schluss erzählten Volksmärchens, die Umgestaltung dichterischer Schöpfungen unter neuem Gesichtspunkt und das Thema: Meine Zukunftswünsche und meine Zukunftspläne.

BOGEN (Berlin)

239. WOESTE, O., Häusliche Arbeitszeit der Schülerinnen. *Zeits. f. päd. Psychol.*, 1921, **22**, 383–389.

Die Schülerinnen einer Klasse der höheren Mädchenschule wurden veranlasst, drei Wochen hindurch Anfang und Ende ihrer häuslichen Arbeitszeit in den einzelnen Fächern festzulegen. Wochen-, Tages- und Fachdurchschnittszeiten Zeitmaxima und -minima einzelner Schülerinnen wiesen dabei ausserordentlich starke Streuungen auf, die ein Übereinkommen der einzelnen Fachlehrer zur unbedingten Notwendigkeit machten. Entsprechend wurde ein Arbeitsplan entworfen, der die durchschnittliche Tagesarbeitszeit und den Anspruch der einzelnen Fächer regelte. Die durchschnittliche Dauer der Tagesarbeitzseit zu Hause wurde festgelegt für 9–11. Lebensjahr auf 90 Minuten, 12. Jahr 100 Min., 13. Jahr 110 Min., 14.–16. Jahr 120 Minuten.

BOGEN (Berlin)

240. KOENEN, H., Physioplastik bei normalen und taubstummen Kindern. *Zeits. f. päd. Psychol.*, 1921, **22**, 389–398.

Kinder, deren Milieu im wesentlichen das gleiche ist, erhielten eine Reihe qualitativ verschiedener Zeichenaufgaben. Diese wurden nach ihrem physio-resp. ideoplastischen Inhalt geordnet und den entsprechenden Schülergruppen zugeordnet. Die Taubstummen weisen zwar in einer Gruppe eine grössere Anzahl ideoplastischer Arbeiten auf als die Vollsinnigen, erweisen sich sonst jedoch als die weitaus stärkeren Physioplastiker. Das Ergebnis stützt die Hypothese, dass die Entwicklung des Wortbildes störend auf die objektive Sachwahrnehmung einwirkt. Hierdurch ist gleichzeitig für die Erklärung der primitiven Physioplastik eine neue Stütze geschaffen. Der scheinbare Verfall der primitiven Physioplastik ist nur der Ausdruck einer innerlichen Evolution, nämlich der Vervollkommnung der Sprache.

BOGEN (Berlin)

241. Reichenbach, H., Moralpsychologische Erhebungen an Kindern. *Zeits. f. päd. Psychol.*, 1921, **22**, 289–316.

Ein Versuch, den Inhalt des ethischen Besitzes der Kinder festzustellen. (Alter 10; 6–12) Das Material wurde durch Einzelbefragung gewonnen und dann unter ein empirisches Schema der ethischen Elementarbegriffe und unter ein Motivationsschema gebracht. Die Häufigkeit der Elemente des Pflichtenschatzes ist bei Knaben und Mädchen im allgemeinen gleich. Zählt man jedes genannte Element nur einmal, so erhält man den Umfang des Pflichtenkreises Je differenzierter dieser ist, umso mehr enthält er zur höheren (altruistischen) Stufe gehörige Elemente. In Bezug auf die Motivation zeigt sich ebenfalls ziemlich gleichartige Struktur bei den Geschlechtern. Das ethische Erleben bewegt sich bei den Kindern des Handwerkermilieus in sehr einfachen und primitiven Bahnen. Bogen (Berlin)

242. Haase, E., Über Auffassung der Winkel an der Wandtafel. *Zeits. f. päd. Psychol.*, 1921, **22**, 249–255; 329–336.

Ein merklicher Einfluss des Geometrieunterrichts auf die Genauigkeit der Auffassung ist nicht nachweisbar. Die Schätzung wird vom 10.–14. Jahre von Jahr zu Jahr genauer. Je jünger die Kindergruppe ist, umso mehr verstreuen sich die Ergebnisse auf alle Gruppen der Wertskala. Die durchschnittliche Treffsicherheit der Knaben entspricht der der 12–13 jährigen Kinder., die Treffcherheit der Mädchen entspricht der der 11–12 jährigen Kinder. Die Treffsicherheit ist auf den hinteren Klassenplätzen grösser als auf den vorderen, doch tritt hinten leichter die Ermüdung auf. Sind beide Schenkel schräg gerichtet, so ist die Genauigkeit am geringsten. Hochlage des Scheitels scheint günstiger als Tieflage, Rechtslage günstiger als Linkslage zu sein.
Bogen (Berlin)

243. Bobertag, O., Untersuchung über den Einfluss der Quäkerspeisung auf die geistige Leistungsfähigkeit der Schulkinder. *Praktische Psychol.*, 1921, **2**, 239–243.

Prüfungen am Beginn und Schluss der Speisungsperiode mit Gespeisten und nicht Gespeisten ergeben, dass sich der geistige Rückstand der Quäkerkinder nach Beendigung der Speisung verringert hat. Die Quäkerkinder unter den Volksschülern weisen

am Beginn einen grösseren geistigen Rückstand auf, als die Schüler der höheren Schulen, holen ihn dafür aber auch relativ schneller auf.

BOGEN (Berlin)

244. SCHORN, M., Begutachtung von Reklameplakaten und Inseraten. *Praktische Psychol.*, 1921, 2, 257–268.

Plakate wurden einer grösseren Anzahl von Versuchspersonen exponiert. Über das Gesehene ist ein Bericht angefertigt, und nachträglich ein Einzelverhör angestellt worden. In einer Häufigkeitsstatistik werden die Bildeinzelheiten, welche die Werbewirkung ausmachen sollen, in Vergleich gestellt zu den werbenebensächlichen Teilen. Das Ergebnis des Vergleiches bildet die Grundlage der Begutachtung der Werbewirksamkeit.—Der Inseraten versuch ist der Hollingworth—Methode nachgebildet.

BOGEN (Berlin)

245. RICHARDSON, F., and ROBINSON, E. S., Effects of Practice upon the Scores and Predictive Value of the Alpha Intelligence Examination. *J. of Exper. Psychol.*, 1921, 4, 300–317.

In order to investigate the effects of practice operative in repetitions of similar mental work, three forms of the alpha examination in the order 5, 7, and 9 were given to thirty-nine college students on three consecutive days. The effects of practice were gotten at on the basis both of right *scores*, and of total number of *attempts*. At certain critical regions absolute values obtained in the tests were used as an index of the predictive significance of the examinations.

In general a marked improvement over the first performance is apparent in the second performance, whereas an improvement over the second performance is less marked in the third. So marked is the improvement in the second performance that critical absolute values derived from the first trial are of little significance. Critical scores selected from the second trial are more likely to retain their functional significance and to serve, therefore, as predictive values. If correlations are made between results in the alpha examinations and scholarship in general, it appears that performance according to *scores* conforms more nearly to scholarship than performance according to *attempts*. Reports from the subjects taking the tests point to such factors as increase in motor facil-

ity, better use of time, familiarity with the technique, shifts in emotional attitude, and identity of materials in the several forms as making improvement with practice possible.

C. C. PRATT (Clark)

246. CAROTHERS, F. E., Psychological Examination of College Students. *Arch. of Psychol.*, 1921, **46**, 82.

The first chapter is devoted to an historical survey of Freshmen tests. In 1896 the first report of the results on mental and physical tests made on freshmen only appeared. It concerned the work done by Professor Cattell and Dr. Farrand on one hundred Columbia University freshmen.

The present investigation was begun by Dr. Carothers in 1915 at Barnard College, Columbia University, about two years before the Army Alpha and the Thorndike Tests were originated, and was carried on during the years 1915–16, 1916–17, the fall of 1917 and the spring of 1919. The aim was, first, to establish norms and standards of performance in mental tests for Barnard freshmen, and second, to give students a clear conception of their abilities and aptitudes along various lines.

Nineteen tests were selected—(1) Coördination, (2) Tapping, (3) Cancellation, (4) Checking, (5) Color-naming, (6) Directions, (7) Opposites, (8) Verb-object, (9) Mixed-relations, (10) Word-building, (11) Word-naming, (12) Knox Cube, (13) Digit Span, (14) Word Memory, (15) Logical Memory, (16) Information, (19) Vocabulary. The subjects were 200 freshmen in Barnard College. Each was tested individually by the investigator, the time being about one hour for each student. The norms and standards of performance for the Barnard freshmen are given for each test. Academic grades and records taken in the gymnasium were compared with the results of the psychological tests. Lack of uniformity in standards of grading among instructors, the personal equation in marking, the rôle played by such factors as lack of incentive, interest in outside or college activities, economic pressure, etc., make college marks inadequate measures of the students' ability. There is evidence that the psychological tests give a true estimate of each freshman's mental capacity. To predict her performance in school or in a future vocation both her capacity and such other factors as interest, incentive, will-power, environmental conditions, etc., must be considered.

On the basis of the results of the investigation Dr. Carothers

offers a few tentative suggestions to college administrators who desire to institute a system of student guidance.

E. Mulhall Achilles (Columbia)

247. Healy, W., Pictorial Completion Test II. *J. of Applied Psychol.*, 1921, 5, 225–239.

Pictorial Completion Test II consists of an illustration to be divided for convenience into two or three parts when mounted. There are eleven pictures 5 x 3½ inches each in the series—one merely for demonstration. They represent in sequence situations occurring during a day in the life of a boy. From each picture there is a piece cut out, one inch square. The subject is asked to complete the picture by selecting the right square from 60 square pieces given him. Most of the 60 pieces are inconsistent but some logical in part to the situation; only one is absolutely right. The ten pictures present situations of greatly differing difficulties—most children of eight years get a credit score and even adults of superior achievement have difficulty in getting a perfect score. The time is recorded—20 minutes being the maximum time allowed. The total score on the test is the sum of the values of the pieces as finally placed. Great interest has been shown in the test.

E. Mulhall Achilles (Columbia)

248. Kuhlmann, F., The Results of Repeated Mental Reëxamination of 639 Feeble-minded over a period of Ten Years. *J. of Applied Psychol.*, 1921, 5, 195–224.

In 1911 a ten-year program was begun by reëxamining all the inmates of the Minnesota School for Feeble-minded, at regular intervals of two years. Cases over 20 years, epileptics, and others in whom some special trait interfered with getting a reliable mental age, were omitted.

A summary may be briefly expressed as follows: (1) The mental ages of the feeble-minded increase with age at a rate proportionate to the degree of mental deficiency. (2) On the whole the mental age ceases to increase between the ages of fifteen and eighteen, the idiot grade ceasing development about three years earlier than the borderline grade. (3) The lower grades lose more frequently in mental age than the higher grades. (4) The frequency in loss in mental age increases with age, independently of grade.

(5) The intelligence quotient decreases with age, and more for the higher than for the lower grades. (6) The intelligence quotient of cases above the average will increase with age instead of decrease, for the same reason that it will decrease for cases below average.

E. MULHALL ACHILLES (Columbia)

249. REAM, M. J., Group Will-Temperament Tests. *J. of Educ. Psychol.*, 1922, 13, 7–16.

Ream describes a modification of the Downey Will-Profile test for group testing, developed by the Bureau of Personnel Research at Carnegie Institute, Pittsburgh. Each part of the group test is described and compared with the original Downey test. Coefficients of correlation show the relation between the scores obtained by a group of 23 persons tested with both the individual and the group forms. It is concluded that the group test is "a fairly satisfactory approximation of the Downey individual test."

The group test has been given to 500 insurance salesmen. As 125 of these salesmen had sales records in the form of amount of insurance sold, the diagnostic value of the tests for insurance sales ability could be determined. Two charts are presented to show the discriminative value of the tests with two separate groups of salesmen. It is concluded that "the tests are of positive value in predicting success in selling insurance."

A. T. POFFENBERGER (Columbia)

250. RUGG, H. O., Is the Rating of Human Character Practicable? *J. of Educ. Psychol.*, 1921, 12, 425–538, 485–501; 1922, 13, 30–42, 81–93.

The data presented in this extended report, gathered under conditions practically impossible to duplicate, form the basis for a severe indictment of character rating scales. There are, according to the author, conditions under which the rating of human character by rating scales is possible, but these conditions cannot be fulfilled where such ratings are needed, *e.g.*, in the public schools. They are: (1) Each final rating given a person must be the average of at least three independent ratings, each one made on a scale as objectified as the man-to-man-comparison type of scale. This is the kind of scale devised by Scott, on which the units are represented by persons known to the one who does the rating, who must construct his own scale. The correlations of intelligence

judged by individual judges and objectively measured by the Army Alpha test in the case of 15 groups of 300 officers each were practically zero. (2) The scales on which the ratings are made must be comparable and equivalent, having been made in conference under skilled instructors. An examination of rating scales shows that they may be comparable at the extremes but widely divergent in the middle, alike at the lower end but otherwise dissimilar, etc. Even where the scales are in fair agreement, the ratings made against them may be widely divergent, or where the scales lack equivalence, the ratings made against them may be in agreement. Finally, exact agreement in comparing one man with another may be paralleled by large disagreement in comparing him with a third. (3) The three raters must be so thoroughly acquainted with the person rated that they are competent to judge. "The data that we studied during the investigation were impressive, pointing to the conclusion that estimates depend closely upon intimacy of acquaintance and that it is important to evaluate the competency of the rater."

Each of these three conclusions is supported by an array of data which would seem to settle the matter of the validity of rating scales once for all. The author makes a plea for objective measures of social and dynamic traits as the real solution of the problem of character measurement.

A. T. Poffenberger (Columbia)

251. Stenquist, J. L., Constancy of the Stanford Binet I.Q. as shown by Retests. *J. of Educ. Psychol.*, 1922, **13**, 54–56.

Stenquist answers the criticisms made against his findings of variability of the I.Q. as due to poor testing. He suggests that the greater variability found by him may be due to improvement through growing acquaintance with the English language on the part of foreign-language-speaking children. He also points out the difference between the variations in the I.Q. in the individual case and variations "on the average," and believes that the serious individual misplacement occurs frequently enough to make the question of the constancy of the I.Q. a very important one.

A. T. Poffenberger (Columbia)

252. Geyer, D. L., The Reliability of Rankings by Group Intelligence Tests. *J. of Educ. Psychol.*, 1922, **13**, 43–49.

The usual method of testing the reliability of intelligence test scores by the size of coefficients of correlation of various sorts

is departed from in this paper. The author asks to what extent the order of intelligence of a group of persons depends upon the particular test used, and to what extent the groupings of a class of students into sections on the basis of intelligence test scores will be dependent upon the particular test used. Concerning two group tests, he says, "If the 120 pupils had been divided on the basis of the intelligence scores of one test into four class sections of ordinary size, 51.6 per cent of them would have been in the wrong section according to the other test, and 31.8 per cent of them would have been out of place by an amount equal at least to half the range of such a class section."

Comparison of other pairs of group tests are made with somewhat similar results. The significance of these differences is discussed, and the question is raised as to whether the tests really measure the same thing. The discrepancy between the size of reliability coefficients for the tests and the coefficients showing the relations between the tests gives point to the question.

A. T. Poffenberger (Columbia)

253. Henmon, V. A. C., and Livingston, W. F., Comparative Variability at Different Ages. *J. of Educ. Psychol.*, 1922, 13, 17–29.

The belief in increased variability during the adolescent period, which forms the basis of certain educational practices in the grades and secondary schools, is subjected to critical examination. The authors make a survey of the data available from a variety of sources on physical and mental measurements at different ages. The law of increasing variability at adolescence holds for height and weight, but it is very evident that it "does not hold for mental traits, so far as the groups for which measurements are available are concerned. On the contrary, there is in the school groups a marked reduction in variability at adolescence as contrasted with childhood." Two reasons for this reduced variability are discussed, namely, the factor of selection and inadequacy of training for the higher levels of intelligence. "In any case pedagogical inferences are based on the normal school population," and this population does not show increased variability at adolescence.

A table of data is presented which shows a slightly greater variability among boys than among girls in both physical and mental traits.

A. T. Poffenberger (Columbia)

254. Capen, S. P., A Year of the Educational Research Committee. *J. of Educ. Psychol.*, 1922, 13, 98–104.

This is a report of the first year's activities of the Educational Research Committee appointed by the Director of the Commonwealth Fund. The general lines of research which will be supported and the conditions under which grants of money will be given are outlined. There is a brief description of the investigations now being conducted. The following extract from the paper should be of interest: "The Educational Research Committee believes that there should be many more appeals for subventions than have thus far come to it and that requests should be made by a much wider range of institutions. Indeed, the conditions of the grant and the policy of the Committee are so flexible that any first-class project which can be clearly defined and budgeted is likely to receive favorable consideration."

A. T. Poffenberger (Columbia)

255. Zirbes, L., Research Problems Raised in Recent Issues of Educational Periodicals. *J. of Educ. Psychol.*, 1922, 13, 1–6.

This study of the contents of nine educational journals (about 3 recent issues of each) is intended to show the trend of research and the problems mentioned as needing solution. The unsolved problems are classified under seven heads, as follows: (1) Mental tests. (2) Curriculum studies. (3) Studies of Administration and supervision. (4) Educational test problems. (5) Learning studies. (6) Rating scale problems. (7) Problems of statistical methods and devices.

Altogether there are sixty-four problems mentioned. This list should be very suggestive for persons seeking research problems with a practical educational bearing.

A. T. Poffenberger (Columbia)

256. Bird, G. E., The Devious Path of Slow Work. *J. of Educ. Psychol.*, 1922, 13, 50–53.

The difference in the character of motor reactions in slow and rapid work which has become an important fact in industrial efficiency is shown to have its counterpart in mental activity. The devious path in space of the slow movement is paralleled by the devious neurone paths traversed in slow mental work. Speed in solving arithmetic problems is correlated positively with

accuracy. The introspections of subjects during slow and fast work showed the presence of distractions during slow work which were absent during rapid work. These distractions include a variety of imagery, unnecessary repetition of numbers, physical uneasiness, losing one's place, etc. Since fast motions are essentially different from slow motions, learning methods should emphasize speed in order that the method learned may be the method that will be finally used.

A. T. Poffenberger (Columbia)

12. MENTAL EVOLUTION

257. Honigmann, H., Untersuchungen über die Lichtempfindlichkeit und Adaptierung des Vogelauges. *Arch. f. d. ges. Physiol.*, 1921, **189**, 1–72.

Untersucht wurden junge und ausgewachsene Hühner in reinen spektralen Lichtern. Die Lichtintensität wurde variiert, indem das Lichtbündel zwei Nikolsche Prismen passierte, von denen das eine gedreht werden konnte. Schwellenprüfung durch Aufpickenlassen von Reiskörnern aus Vertiefungen des Bodenbretts. Sehr scharfe Schwellenwerte. Junge, helladaptierte Hühner sehen rotes Licht sehr viel heller als helladaptierte Menschen! Mit der Geschlechtsreife sinkt die Empfindlichkeit für kurzwellige Lichter. Dunkeladaptation ist vorhanden, tritt aber viel langsamer ein als beim Menschen. Bei Dunkeladaptation ist das Menschenauge für Rot dem Hühnerauge überlegen. Während der Adaptation steigt die relative Empfindlichkeit für kurzwellige Strahlen (Purkinjesches Phänomen).

Bethe (Frankfurt a/M.)

258. Zühlsdorff, E., Die mechanistische Unterströmung in der modernen Tierpsychologie. *Deutsche Schule*, 1921, **25**, 251–255.

Wägt die von der Naturwissenschaft herkommende Tierpsychologie gegen die von der Psychologie ausgehende gegeneinander ab. Würdigt das Verdienst der ersteren in Bezug auf den exaktwissenschaftlichen Unterbau, den sie der Lehre von der starken Gebundenheit des Willens im Naturgesetzlichen gegeben hat.

Bógen (Berlin)

BOOKS RECEIVED

OSSIP-LOURIE. *La graphomanie.* Paris: Alcan, 1920. Pp. 232. 7 fr. 50.

W. STERN & O. WIEGMANN. *Methodensammlung zur Intelligenzprüfung von Kindern und Jugendlichen.* Leipzig: Barth, 1920. Pp. v + 256. M. 24.

W. MINKUS, W. STERN, H. P. ROLOFF, G. SCHOBER, A. SCHOBER & A. PENKERT. *Untersuchungen über die Intelligenz von Kindern und Jugendlichen.* Leipzig: Barth, 1919. Pp. iii + 167. M. 15.60.

W. PETERS. *Ueber Vererbung psychicher Fähigkeiten.* (*Fortsch. d. Psychol. u. ihrer Anwend.*, 3, 185–382.) M. 6.40.

W. BROWN & G. H. THOMSON. *The Essentials of Mental Measurement.* Cambridge: Univ. Press, 1921. Pp. x + 216.

J. C. CHAPMAN. *Trade Tests: The Scientific Measurement of Trade Proficiency.* New York: Holt, 1921. Pp. ix + 435.

A. GEMELLI. *L'origine delle famiglia.* Milano: Vita e Pensiero, 1921. Pp. 133. L. 5.

M. DIDE & P. GUIRAUD. *Psychiatrie du médicin practicien.* Paris: Masson, 1922. Pp. 415. 20 fr.

R. H. HINGLEY. *Psycho-Analysis.* New York: Dodd, Mead, 1922. Pp. vii + 190.

G. HARTMAN. *The Child and His School.* New York: Dutton, 1922. Pp. xiii + 248. $3.00.

F. X. DERCUM. *An Essay on Physiology of Mind.* Philadelphia: Saunders, 1922. Pp. 150. $1.75.

F. PIERCE. *Our Unconscious Mind and How to Use It.* New York: Dutton, 1922. Pp. xi + 323. $3.00.

F. KUHLMANN. *A Handbook of Mental Tests.* Baltimore: Warwick & York, 1922. Pp. 208.

B. ERDMANN. *Grundzuge der Reproductionspsychologie.* Berlin: De Gruyter, 1920. Pp. viii + 186.

A. BROUSSEAU. *Essai sur la peur aux armées, 1914–1918.* Paris: Alcan, 1920. Pp. 162. 6 Fr. 60.

F. E. CAROTHERS. *Psychological Examinations of College Students.* (*Arch. of Psychol.*, No. 46, 1921.) Pp. 82.

C. Baudouin. *Suggestion and Autosuggestion.* (Trans. by E. & C. Paul.) New York: Dodd, Mead, 1921. Pp. 349.

J. Magnussen. *God's Smile.* (Trans. by D. K. Dodge.) New York: Appleton, 1920. Pp. ix + 185.

R. Ingalese. *The History and Powers of Mind.* New York: Dodd, Mead, 1920. Pp. xxv + 329.

E. Bozzano. *Les phénomènes de hantise.* (Trad. de l'italien par C. de Vesme: pref. du J. Maxwell.) Paris: Alcan, 1920. Pp. xii + 311. 10 fr.

M. Dessoir. *Vom Jenseits der Seele.* (3te Aufl.) Stuttgart: Enke, 1919. Pp. xvi + 354.

v. Schrenck-Notzing. *Phenomena of Materialization.* (Trans. by E. E. F. d'Albe.) New York: Dutton, 1920. Pp. xii + 340. $15.00.

NOTES AND NEWS

Dr. Wolfgang Köhler has been appointed director of the Berlin Psychological Laboratory, to fill the vacancy caused by the retirement of Professor C. Stumpf.

Professor J. W. Barton, of the School of Education of the University of Idaho, has been promoted to a full professorship of psychology.

Dr. W. H. R. Rivers has been elected a member of the Athenæum Club for "distinguished eminence in science."

The American Association for the Advancement of Science have given the following grants to psychologists: to Professor Raymond Dodge, Wesleyan University, four hundred dollars for the development of an instrument for recording eye movements; to Professor Franklin O. Smith, Johns Hopkins University, three hundred dollars for the purchase of a monochromatic illuminator to be used in research on color vision.

President W. D. Scott, of Northwestern University, gave the address at the 124th convocation of the University of Chicago on March 21. The title of the address was "Handling Men."

We are pleased to announce the appearance of two new journals which will contain articles of interest to psychologists. The *Ontario Journal of Neuro-Psychiatry* is published by the Depart-

ment of the Provincial Secretary of the Province of Ontario, at Toronto. The first number contains, among others, articles by C. B. Farrar on "The Genesis of Delusions as Evidenced by the Revival of Spiritism," and by R. G. Armour, on the "Mental State of Hysteria." The *Archives of Occupational Therapy* is published by the Williams and Wilkins Co., Baltimore, and is edited by W. R. Dunton, Jr., and a group of associates.

At the University of Chicago summer quarter, first term, Dr. Shepherd Ivory Franz will give courses on abnormal and on physiological psychology.

The first volume of a series of reprints and translations, to be known as *Psychology Classics*, is in press and will appear shortly. The series is to be edited by Knight Dunlap and published by the Williams and Wilkins Company in Baltimore. The first volume contains a translation, by Miss Istar Haupt, of Lange's monograph on *The Emotions*, with reprintings of James' article "What is an Emotion?" from *Mind* and his chapter on "The Emotions" from the *Principles of Psychology*. In order to facilitate the preparation of further translations and reprints, the royalties from these volumes will be matched by an equal amount by the Williams and Wilkins Company, the fund so constituted to be deposited with the Treasurer of the Johns Hopkins University, and to be applied solely to the defraying of clerical and other necessary expenses of such preparation. The editor requests suggestions concerning future volumes, and coöperation in their production.

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THE

PSYCHOLOGICAL BULLETIN

THE PSYCHOLOGICAL EFFECTS OF DRUGS

BY MAX F. MEYER

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It is no easy matter to sum up the work on drug effects done during the last decennial period. The difficulty does not result from there being so large a number of studies. The number is not excessive. But it is difficult to summarize because so few of those who report results seem to have conceived their problem in definite terms. In many cases one gets the impression that the author was induced to make an experimental study, not by the conception of a problem, but rather by the fortuitous fact that a certain drug existed. Such studies, unguided by theoretical forethought, are, of course, capable of yielding valuable discoveries. But they are more likely to yield merely some records which their author can give the appearance of having scientific value only by searching in text-book psychology for a chapter heading in traditional terminology fit to receive those records as its children,—as when one of our authors reports that bromides reduce "the power of attention." Has that statement any scientific meaning?

No reference will be made in the following to articles which in the present writer's judgment interest exclusively a surgeon in quest of health for his patient, or only a physiologist working on problems of the entirely unsocial life of the individual, or only a sociologist arguing for or against drug prohibition. Of the greatest value have been to the writer the previous summaries on drug effects published in the BULLETIN by A. T. Poffenberger in 1914, 1916 and 1917.

Many psychologists most naturally are interested especially in the question how those drugs which our social habits tempt us

to apply to ourselves increase or diminish our efficiency as workers of whom human society expects a certain output of work and rewards us or punishes us according as we accomplish more or less than is expected of us.

It is natural enough that during the last decade alcohol should have interested a larger number of students of the drug problems than any other drug. Prohibition was coming and came. Nevertheless, the psychological studies here reviewed furnish virtually no argument either for or against prohibition. Even if such studies show that a drug makes us weak, it is still an open sociological and moral question if it is not perhaps desirable that at times we should be weak.

The chief interest of the psychologist may be summed up in the question whether smaller or larger doses of alcohol during the succeeding moments of time increasingly or decreasingly affect by weakening or strengthening equally or unequally the lower and the higher centers of the nervous system accustomed or unaccustomed to alcohol. To this question we receive the following answers:

1. That the nervous system is the less affected by any given dose of alcohol the more it has previously been subjected to this poison is so generally agreed on by all those who mention this phase of the question, that it is unnecessary to call the witnesses by name. Pierre Janet (13), in connection with this fact, makes a statement, however, which to the present writer seems misplaced. After mentioning the fact, identical with the one just referred to, that "drunkenness" is not a characteristic of the alcoholic, he adds that states of very great "mental depression" are frequent in alcoholics. Asserting now, introspectively, that mental depression is equivalent to "terrible suffering," he makes the following plea: "If we recollect that alcohol rescues alcoholics from terrible suffering, we shall understand that it involves for them temptations that a normal person does not feel."

The present writer, who is virtually a lifelong total abstainer, asserts that he also has quite frequently (Maybe he is not normal, but who is?) states of very great "mental depression" due to such causes (other than alcoholism and also mentioned by Janet) as "overwork, too great ambition, struggle." He dares Mr. Janet to prove that the present writer's (introspective) "terrible suffering" is less than the alcoholic's (introspective) "terrible suffering." The only objective difference seems to be that the present writer,

although he has quite enough experience with alcohol to know how he could easily rescue himself from his "terrible suffering," *does not have the habit* of thus rescuing himself, whereas the *average* alcoholic *has acquired that very foolish habit.* Does not the difference in *intelligence level* offer a more (among various additional ones) acceptable explanation of the possession of, or freedom from, such a foolish habit, than the supposition of *different quantities* of a purely *subjective* and therefore not measurable "terrible suffering and temptation"?

2. That alcohol, to a *superficial* and easily illusioned observer (who may be the very person who took the alcohol), changes a person from being less reactive to being more reactive, that is (shifting the system of coördinates) from more depression to less depression, is so generally agreed on, that this fact, too, does not call for witnesses named among those reporting their experiments. But this is entirely in agreement with the fact that the drug *weakens* certain (which, we do not know yet) functional properties of the nervous system. The only outward weakening which the *superficial* interpreter regards as plain weakening, however, is unfortunately that of the drugged person's "acting sleepy." But the drugged person's "acting lively," when that really consists in no more than making puns, being clownish or considering all risks of life as having vanished, is not the logical opposite of "acting weakened, sleepy." Is it not a "weakening," too, when the *best* reactions a drugged person can make consist in repeating the stimulus word, or saying nonsense, or being wordy? Compare Jörger (14) and Miles (22).

It would add much to the clearness of expression if psychologists would agree to speak of the "weakening" effect of alcohol and to avoid entirely the misleading term "depressing," however *popular* the latter may be. And still better reasons do psychologists have for never formulating such a question as that of the "depressing or *stimulating*" effect of a drug, for a psychologist ought never to speak of *stimulation* unless he has in mind a stimulus acting on a sense organ. Why not formulate the question by using the terms "*weakening and strengthening* a certain functional property of the nervous tissue" rather than "depressing and stimulating"?

3. There seems to be little doubt that the difference between the effects of small and of large doses of alcohol is nothing but the difference between little and more effect of the same kind

on the same tissues. Some authors state this very emphatically. "Variation in size of dose causes only quantitative change," Lange and Sprecht (17). "The larger the dose, the greater is the effect," Karlson (15).

4. The effect of the alcohol on the nervous system reaches a maximum about 90 or 100 minutes after imbibing (Dodge and Benedict (6), and Benedict (2)).

No sufficient light seems to have been shed during the work of the last decade on the following questions: Does the time when the maximum effect is reached differ with the size of the dose? It is quite possible, for example, that a small dose will reach its maximum effect sooner than a large dose. Does the effect increase first rapidly and then slowly during the interval between imbibing and the maximum effect, or the reverse? And how about the manner in which the effect decreases with further time? Here are large open questions for the future investigator.

5. Whether the alcohol dose affects the higher and the lower centers of the nervous system equally or unequally is a question of enormous significance. The consensus of opinion seems to be that the function of the higher centers is more weakened than that of the lower centers. But the fact is expressed in various kinds of phraseology. Benedict apologizes for the apparent observation to the contrary by introducing the mysterious stranger of an "autogenic reënforcement" which causes such an illusory observation. The present writer would put this autogenic reënforcement in the same class with such phenomena as a person not being able to do good work in the morning until he has *strengthened* himself by eating breakfast. Likewise, some people may *strengthen* themselves by a dose of alcohol. Rivers, for example, found typewriting speed increased. Others do it by silent, or loud, prayer.

Karlson states that "alcohol impairs every faculty; the higher the faculty, the greater is the effect." Karlson's statement, that the impairment is one of quality rather than of quantity of work, seems to have the same meaning. Does not the quality depend on higher centers more than the quantity? And the rats of Bagg (1) who did not get out of the maze very easily after having inhaled alcohol fumes probably used in this work the very highest centers which Nature had placed at their disposal.

The chief deficiency of the experimental investigations concerning the difference of the drug effects on higher and lower

centers consists in the fact that really high centers in the human nervous system have been systematically avoided by the experimenters. This is true not only for the alcohol investigations, but for those of all other drugs. But we may as well point out here at once this general deficiency with regard to alcohol.

Dodge and Benedict, for example, have intentionally selected for their observations "processes as remote as possible from voluntary, conscious modification and control." The idea obviously was a double one: first, to study functions as simple and primitive as possible, served by as low centers as possible; and secondly, to exclude the trouble caused by the learning process, which prevents the measurements, even without changing the dose of the drug, from being constant. So much, so good, as far as the lower centers are concerned. But with the higher centers the idea would again be a double one: first, to study functions as complex as possible, served by the very highest centers; and secondly, to exclude again the learning process.

That, however, is obviously impossible. There are no high intellectual functions which are not subject to the learning process, that is, to improvement from case to case. It does not do any good to select as highly intellectual functions such functions as typewriting and multiplication. Such functions as the use of the multiplication table are not, in human life, to be considered as highly intellectual. And the worst is, that even these are still subject to the learning process. Some investigators have tried to overcome this last-mentioned difficulty by making the subjects first go through a "preliminary practice." But they will not find anybody credulous enough to believe that that preliminary practice really abolished all further learning.

The present writer believes that one should bravely face the enemy, that is, the learning process. Indeed, instead of avoiding him one ought to invite him to coöperate. If one wants to discover the influence of drugs on intellectual processes, one ought to select the very highest intellectual processes, provided only that one can measure them. How to get rid of the learning curve is a separate problem. The present writer believes that that problem is easily solved.

He is using in experiments now in progress a simple method which seems to be capable of solving it. But the experiments will not be published until more data have been accumulated, and he will therefore here abstain from counting his chickens

before they are hatched. He merely wants to emphasize that in his opinion one serious deficiency of the work done during the last decade consists in avoiding all those processes which are subject to improvement during continued testing. They are the very processes that interest us most. An artist drinking a bottle of wine before going to work does not intend thereby to improve his knee jerk. And the student who drinks a cup of tea before a mathematics examination does not intend thereby to improve his use of the multiplication table. The highest intellectual processes ought to receive the chief attention of the experimenters of the future.

So far as tobacco is concerned, our present knowledge is much less satisfactory than that with regard to alcohol. Berry (3) and Bush (5) report absolutely contradictory results. The former reports that on smoke days the work was done in less time and with fewer errors. The latter reports a decrease in efficiency. The present writer, on the basis of his (unpublished) experimental data, believes that Berry is right and Bush is wrong, so far as the real drug effect of the smoke is in question. Here as with alcohol the "autogenic reënforcement" (whatever that may be; call it suggestion, if you wish) is a very disturbing factor in experiments. But in standing with Berry, the writer does not wish to disagree with C. K. Taylor (24), who brings forward plenty of evidence that smoking is an evil, especially for those who are not yet fully grown. And the same view is suggested by W. H. Burnham (4), even though he points out that the fact of smoker boys being of inferior scholarship is likely to be due to a third factor as a common cause, namely, social inclination.

A good deal has been learned about caffein and its relatives. C. K. Taylor (25) tells us the very interesting fact that coffee-drinking children in the schools (like smoker boys) are not likely to be found among the physically and mentally superior children. But he does not prove that they have been stunted exclusively or chiefly or in any degree by drinking coffee. He fails to emphasize that coffee-drinking children are quite likely to have inferior parents. Frankfurter (7) reports increased efficiency in typewriting resulting from tea and caffein. The elaborate work of H. L. Hollingworth (1) is in full agreement with this.

Raising the same five questions which we raised with respect to alcohol, the answers would be the following: (1) General addiction or abstention from tea or coffee seems to make no appre-

ciable difference in the effect of a dose. This condition is thus very different from that of alcohol. It does make a difference, however, whether the stomach is empty or full. And a given dose has less effect on a heavier body. (2) The effect is a strengthening of certain functional properties of the nervous system. (3) The effect increases with the dose. An overlarge dose, however, is likely, after a short time of increased efficiency, to result in decreased efficiency. This seems to be causally connected with the fact well established by physiological investigators during the last decade, that large doses of caffein have a harmful effect on many different kinds of tissues of the animal body. (4) The effect increases during the first hour, is still noticeable after four hours with little decrease and may last quite a while longer. This has some significance on its effect on sleep. A very small dose, however, is not likely to interfere with sleep. The exact rise and fall of the time curve of this drug is a problem of the future. The positive effect, however, does not seem to be followed at any time by a negative reaction. (5) The drug seems, like alcohol, to affect the higher centers more than the lower ones. Further evidence is still needed.

Schilling (**27**), in what is probably the most recent experimental contribution, finds in reaction time tests always continued for an hour that the reaction time during that hour becomes longer and longer, and more so after imbibing caffein or acetanelid than after imbibing a mere "control". The reviewer thinks that a plausible way of interpreting the result of Schilling very briefly, and therefore in very popular language, would be that of saying: The caffein *increased the boredom or impatience* incident to the experimental procedure and therefore increased the reaction time through causing loss of interest in its being measured.

Strychnin is one of those drugs which are not offered to us in the grocery store. Nevertheless, it interests the psychologist because the answer obtained for the above five questions may help him to decide whether those five questions are well formulated. (1) Nothing seems to be known about the influence of previous addiction. (2) The effect seems to be a strengthening of a functional property of the nervous tissue. But speaking of human efficiency in general, Poffenberger teaches that moderate doses of strychnin taken into the stomach produce no clear-cut change. (3) As to the difference in effect between large and small doses,—when Lashley (**18**) tells us that a *large* dose facilitates (in an albino rat) the learning of a maze, whereas caffein retards the learning,

we ought to consider what was said above under (3) about large doses of caffein. (4) Nothing seems to be known yet about the time curve of strychnin, except that Lashley reports the absence of serious after effects. (5) Strychnin seems to affect the lower centers especially, whereas atropin seems to hold the middle ground between strychnin and caffein (Poff. 14). Porter (23) tells us that strychnin tends to bring all reflexes to the same *maximum* speed, and that therefore it has a less conspicuous influence on those reflexes which, like the flexion reflexes of the cat, have already without the drug a great speed.

About another drug, mescalin, Knauer and Maloney (16) say that it produces "hallucinations," a state somewhat midway between the hypnotic and the normal state. When they say, however, that immediately preceding experiences have some influence on the nature of the hallucinations, one wonders what that remark has to do with the drug.

Meier (21) finds that bromides have the effect of weakening the functional properties of the nervous tissue. Certain results might be interpreted by the conclusion that the weakening is stronger in the higher centers.

V. H. Veley and W. L. Symes (26) worked with stovain and various homologs. One might conclude from their results that this drug has a greater effect of weakening, though acting more slowly, on the lower centers than on the higher centers.

The work of S. I. Franz and W. C. Ruediger (8) with ethyl chloride as an analgesic interests us especially because it shows that the hairs have two distinct sensory end organs, though possibly no separate nerve supply. The disappearance of the touch sensation is less persistent than that of the pain sensation.

Opium alkaloids according to Macht and Isaacs (19) seem to have on the nervous tissue first a brief effect of strengthening and then a very long effect of weakening. The larger the dose, the more abbreviated is that first effect of strengthening certain functional properties.

Goddard (9) showed that pineal extract has no effect on "mental development" in human beings. McCord (20) asserted that it increased "mental development" in dogs, though not in guinea pigs and chickens.

Friedrich Hacker (10) studied the effect of antikenotoxin. Antikenotoxin is a commercial chemical recommended against fatigue, first prepared by Weichardt and sold by Kalle in Biebrich. Kenotoxin is the name given by Weichardt to those substances

(some of them produced by the active animal organism) which produce in the animal's muscles, nervous tissue, and possibly other tissues, the physiological phenomena of "fatigue." These kenotoxins are far more complex compounds than such compounds as lactic acid or uric acid. Previous experimenters assert a fatigue-retarding effect both on muscle work and on scholarly work, after either subcutaneous application of antikenotoxin or inhaling it sprayed in the air. Hacker found that the continuous reading of nonsense syllables was not aided through antikenotoxin, whereas it was conspicuously aided through caffein. The same result was obtained in muscular work under antikenotoxin or caffein. Arithmetical school work under antikenotoxin sprayed in the air appeared entirely uninfluenced.

With respect to the question of "consciousness" the present writer would divide psychologists into two classes: those who believe that an analysis of their own (they cannot analyze any other) consciousness might (but not must) guide them in their scientific pursuit of objective facts and theories; and those who believe that it is the task of the psychologist, or at least one of his tasks, to find an answer to the question whether this or that concrete individual in this or that concrete situation has this or that consciousness or none. E. Jacobson (12) seems to belong to the second class. He decides his question to some extent by stating as his conclusion that persons are conscious under anesthetics even during the height of a surgical operation. His conclusion is based chiefly on his "memory" afterwards. He adds, quite rightly, that "amnesia" after the operation can never be regarded as proving that during the operation there was *no* consciousness. Those interested in metaphysics may decide whether "memory" after the operation is capable (as Jacobson thinks) of proving that during the operation there *was* consciousness.

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FEELING AND EMOTION

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The Emotions—Theoretical

Link (13) is convinced that "the classical concepts of emotions and instincts are a hindrance rather than a help to future studies." By regarding the emotion as a mental state and the instinct as the bodily change which characterizes the emotion, "it is made absolutely impossible to establish any causal identity, or even a schematic identity between the two." For example, experiments with animals are quite futile because it is impossible to secure data on the psychic phenomena. The classifications of emotions given by McDougall and others are said to be entirely arbitrary and misleading. If emotions are, as McDougall believes, fixed and independent in character, it is impossible to account for their fusion into "sentiments" which are more powerful than the fundamental forces themselves; "only the most fanciful and uncritical imagination can follow the process by which it is done."

Kantor (11), none the less destructive, is more constructive in his two articles He submits that the emotion is not a positive response to a stimulus, but rather a failure of a stimulus-response coördination to operate Emotions are essentially "no response" activities The individual left without a directed mode of adjustment is thrown back upon primary responses, namely, the organic reflexes. "It is these *replacement*[1] reflexes which give emotional conduct the appearance of positive adjustment."

Several consequences must follow from such a negative character of emotions as Kantor describes. 1. Emotional activity can be of no general and necessary utility to the organism; in fact, emotional conduct must be always truncated and ineffectual action, "disrupting chaos," momentary paralysis. 2. Emotional conduct must not be interpreted as an hereditary form of behavior, since it is due to the breakdown of acquired stimulus-response systems or to the absence of adaptive reactions. 3. Because emotions are "no response" actions, they cannot readily be clas-

[1] Italics mine.

sified. Each must be studied as it occurs, in connection with its particular stimulus-response conditions. Most misleading has been the custom of connecting emotions with "those teleological entities called instincts." 4. It follows from the disruptive character of emotional behavior that emotions are seldom, if ever, observed in animals and young children, since such organisms have not reached the stage of acquiring sufficient response systems to become disrupted. Kantor urges the discard of the search for biological utility for a direct study of emotions as responses to "disrupting conditions of the environment."

Shand (**22**) has restated objections to McDougall's theory of the association of specific primary instincts with specific emotions. The emotion is a general activity, including an impulse, aroused when an instinctive impulse is not leading successfully toward its consummation.

Differing from all these hypotheses, and in most respects the very antitheses of Kantor's, are those appearing in Woodworth's recent *Psychology* (**26**). While the emotion is, introspectively, a "stirred-up state of mind," suggesting a breakdown of the organism's integrations, as a matter of fact, the "emotion represents internal preparation for some type of over action." It is pointed out that although sustaining evidence of utility is lacking in the case of many emotional states, there is no noteworthy contradictory evidence. For example, the fact that certain emotions, under civilized conditions, may be of no utility, does not discredit the theory since it is based on the assumption of adaptation to primitive environment, and not perfect adaptation at that.

Woodworth makes good use of the James-Lange theory without accepting it wholly. The trouble, in his opinion, has been a confusion of emotions with impulses, the latter being really the criteria by which emotions have been differentiated in speech. Fear and anger, as organic states, are much alike, but as impulses quite unlike. Typically, the impulse generates the emotion, but the emotion is never the same as the impulse. Temporarily the order of events is: *Stimulus*, say, a bear; *Response*, (*a*) seeing the bear; (*b*) recognizing a dangerous situation; (*c*) adjustment toward escape (*i.e.*, impulse); (*d*) internal preparatory reactions, glands, visceral mechanisms, etc.; (*e*) conscious stirred-up state consisting of blended sensations of all these preparatory reactions (*i.e.*, emotions); (*f*) definite escape reaction.

Emotions are "native states of mind; or, as modes of behavior, they are like instincts in being native behavior." Like McDougall

he posits certain primary emotions, such as anger, fear, lust, "the comfortable state appropriate to digestion," grief, mirth, disgust, curiosity, the tender emotion and "probably a few others." The really distinct primary emotions are much fewer than the instincts, but "several of the primary emotions are attached to specific instincts." While this sounds like McDougall, the theories are essentially different; the presence of a primary emotion is not, for Woodworth, the criterion of the primary instinct. The important relationship is merely that in some cases the emotion represents bodily readiness for instinctive action. Woodworth's theory is thus an adaptation of the hypotheses of James, McDougall and Cannon, with certain features found in none of them.

McDougall's analysis of belief (16) leads him to include it with confidence, hope, anxiety, etc., which are treated in the *Social Psychology* as "derived emotions." All of these are members of or named points in a continuous scale of emotional experiences which may accompany and qualify the operation of any strong desire. Belief is very similar to confidence.

Larguier des Bancels (12) finds the emotional chill experienced by the observer of art, music, etc., to be a residual of primitive fear whose stimulus was the mysterious. The chill may appear in admiration, since the latter is a compound of curiosity, humility, and fear.

Janet (9) has submitted as a general explanation of phobias, the "fear of action." The phobia is an alibi or defense mechanism which enables the subject to avoid some unpleasant work or activity. Kaiser (10) has discovered a new generalization which is alleged to include all springs of action. He finds that a "craving for thrill" is the fundamental instinct, and that all varieties of activity are its results. The interesting implication of this paper is the convenience with which "sex" might be substituted for "thrill," or how, in Freud's writings, the reverse might be done without interfering with the underlying logic of either system.

Buscaino (4) describes a number of clinical cases portraying disturbed emotionality correlated with defects of the mid-brain, particularly the thalamus. He adopts a theory, essentially the James-Lange, which, he finds as did Titchener earlier, has been repeatedly framed from the time of Aristotle.

The new and admirable text on the form and function of the central nervous system, by Tilney and Riley (23), includes frequent generalizations concerning the localization and dynamics of

emotions and feelings. The belief that the frontal lobe dominates all behavioral reactions is reminiscent of Wundt. The rich connections of the frontal lobes with the thalamus provides for a great expansion of feeling tone "which plays such a compelling part in the motives of all voluntary activity." All of the superstructures posited by these writers are clearly patterned after the theories of McDougall. For example, "the primitive emotions enter into secondary and tertiary combinations, and thus determine the more complex emotions and sentiments. Yet however complex they may become, these psychic combinations of the cerebral cortex are fundamentally dependent upon the thalamus for their primitive source of affective energy." The reader who seeks the evidence of this dependence, or how it comes about, will be disappointed.

The Emotions—Experimental Studies

A study of emotional expressions by means of photographs reported by Ruckmich (20) showed, as did similar experiments by Langfeld, that the mood of the subject colors the interpretation. It was found that the lower half of the face provides more important clues than the upper, and that the mouth and eyes provide specially important signs.

Russell's selections (21) from the poetic writings of Browning provide interesting descriptions of emotional consciousness and expressions.

Ferrari (8) and Gualino (9) have described the behavior of several soldier deserters condemned to be shot. It was found that evidence of disintegration appeared earliest in the postural reflexes, mental control usually being maintained until the last.

The possibilities of detecting deception by the use of objective tests are optimistically described by Marston (15). While the galvanometric, association reaction-time and the Benussi breathing tests were found wanting, the systolic blood pressure records were reported to have given "100 per cent. accuracy of judgment under very different conditions." Burtt (2, 3) has improved the Benussi inspiration-respiration ratio procedure for determining the lying consciousness and finds it a useful supplement to blood pressure methods. The latter he finds misleading in 10 per cent. of the cases.

An introspective and questionnaire study of the development of admiration by Moore (17) shows pronounced age differences,

characterized by a decline in admiration of relatives and religious characters, and an increased admiration of brave and powerful public characters. A great decrease in the relative numbers of fears and fear dreams between ages four and nine (from 80 to 12 per cent.) appeared in an investigation by Boyd (1). This writer believes that both specific and general fears are inherited, the criterion being the unlikelihood of opportunity for acquiring them. The instinctive fears have as stimuli, eyes, teeth, snakes, great wild animals, wind and sea and death.

Pressey (19) has offered a second revision of a series of four group tests of emotional traits. Basing his statement on the study of a hundred college students, the author says that "such examinations will be more accurate than Army Scale Alpha in prognosticating unsatisfactory work in college."

Feelings—Theoretical

Along with his criticisms of the classical concepts of the emotions, Link (13) finds equally great defects in the treatment of the affective processes. These, he finds, are not emotions, nor are they guides or results of emotions. The feelings are, in fact, the more fundamental, both genetically and actually, since they appear merely as symptoms of "getting along well" and "getting along badly." Since feelings, however, imply a normal course or "possibly a purpose," we must look still deeper for the fundamentally dynamic factors of behavior.

Kantor (11) believes that his naturalistic theory of emotions (the emotion being a collapse of situation-response adjustment) provides the setting for a precise distinction between these phenomena and feelings. The presence of an organized response system in the act is the criterion of feeling. Furthermore, feelings may be conceived as having potency to condition other activities, "in the sense that while they are operating they will affect any activity the person is performing," whereas the emotion, being merely the replacement of organized responses by a chaos of organic reflexes, has no such dynamic influence.

Woodworth (26) adopts the concept of simple feelings, *i.e.*, pleasantness and unpleasantness together with a neutral state of indifference. The simple feelings differ from sensations in that (1) they cannot be introspectively observed as sensations may; (2) they cannot be localized as sensations may; and (3) they have no definite sense organs. They are not considered to be associated

with definite organic activities, because of the overlapping of states of pleasantness and unpleasantness; nor with differences in the ease of brain action, since the facts of practice would contradict such an hypothesis. The fact that feelings are associated with impulses is at the core of the whole problem. Pleasantness goes with a neural adjustment directed toward keeping . . . while unpleasantness goes with an adjustment toward riddance. The nearest approach to a statement of cause is this: "Bitter is unpleasant because we are so organized, by native constitution, as to make the riddance adjustment on receiving this particular stimulus. In plain language, we seek to be rid of it, and that is the same as saying it is unpleasant. Sweet is pleasant for a similar reason. In indifference there is no tendency either to keep or to be rid of it."

There are, however, two kinds of feelings: (1) those typified by sweet and bitter which are immediately and invariably aroused and (2) those which may be called secondary because they depend on "pre-aroused desires," *i.e.*, eating, fighting, catching a train. "Just arouse any desire, and then you can give pleasure by gratifying it, displeasure by thwarting it." There are, also, *native* likes and dislikes, such as those for mathematics, music, colors, which may be contrasted with *acquired* likes and dislikes, such as those for cheese, tobacco or color combinations. Woodworth contends in opposition to McDougall that the likes and dislikes for mathematics, odors, machinery, etc., are not necessarily dependent upon instincts but are primary.

Duprat (6) suggests as a basis for the practical classification of men, the expansive and depressive types. Starting from some of the data on feeling, this writer is soon generalizing far beyond experimental limits.

Feelings—Experimental Studies

An experimental study directed to the fundamental issue of the validity of feeling as a unique, non-sensory element as Titchener contends, was reported by Yokoyama (28) who employed the method of paired comparisons. The introspections of this writer's subjects indicate that pleasantness and unpleasantness are meanings or attitudes for which organic sensory content is the *sine qua non*, at least under the conditions of the paired comparison procedure.

In Young's investigation of feelings aroused by odors, tastes, etc. (29), unpleasantness was found to be associated with reactions away from the stimulus-object, whereas pleasantness was organically-kinæsthetically negative,—the subject did nothing. Corwin (5) believes that these results were due to the conditions of the experiment which made pursuit unnecessary under pleasantness. With certain changes in the setting, Corwin found that pleasantness correlated with actual pursuit, tendencies to pursuit, or a kind of expansion or relaxation *toward* the stimulus-object.

Color and form appear to act in independence in determining the affective response to a combined color-form, according to Yokoyama (28). The affective tendency of the color-form unit varies approximately with the algebraic sum of the affective tendencies of the constituent color and form. This finding is essentially in accord with the orthodox conception of the simplicity of feeling tones, as, for example, that given by Geissler in the Titchener Commemorative volume: "the greater the pleasantness of the individual constituents, the greater will be the pleasantness of the combination." M. F. Washburn (24), using the method of judgments of single stimuli, reaches a different conclusion, that the effect of the combination is by no means the summation of the effects of the elements. Frequently two colors, individually pleasant, form an unpleasant combination. Washburn and Grose (25) found it possible to change the affective value of color by four devices: (1) ordinary adaptation (affective fatigue); (2) shifting of attention to various constituent features; (3) imagining different contexts; and (4) deliberately setting up the contrary reaction (compensation). The method of imaginary context was most frequently and successfully employed by the subjects. Extreme judgments were harder to change than moderate; extreme unpleasantness was harder to change than extreme pleasantness.

The emotional significance of various lines (drawn by pen) was studied by Lundholm (14). For example, beauty is expressed by unity of direction, continuity, roundness of curves, lack of angles and a certain symmetry; ugliness by the reverse of these. Anger, sorrow, etc., are suggested by various combinations of these factors.

An extensive study of the dynamic effects of colors was undertaken by Pressey (19). Performances in tapping, multiplying, reaction-time, etc., were not perceptibly influenced by either color or light intensity. Introspective estimates of feeling attitudes

varied from subject to subject with agreement that the affective value became less with habituation. Reviewing the literature, Pressey feels that there is no reliable evidence that hues have a marked effect either upon emotional tone or on ability in mental work.

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THE PSYCHOLOGY OF VOCATIONAL SELECTION

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The term vocational selection may be interpreted very broadly or very narrowly. It is sometimes made to include a large part of the vocational guidance field and, on occasion, the fields of educational selection and guidance as well, while at other times it is limited strictly to the matter of choosing men to fill particular jobs. The present review makes use of the more limited definition. We exclude vocational guidance and placement (selecting jobs for individuals in contrast with selecting individuals for jobs), educational guidance and selection (both the selecting of courses of training for individuals and the selecting of individuals for courses or classes), physical examinations for selection, and all the wealth of mental test material where the tests have not been either devised for purposes of vocational selection or actually used for such purposes.[1]

Vocational selection is a practical affair. True, certain of its methods and tools are distinctly psychological. But any decision as to what may and what may not be labelled the "psychology" of vocational selection must be regrettably arbitrary. The close interrelation existing between applications and "pure" science in this field, or better, between administrative and research activities, bears upon the nature of the present review in several particulars. In the first place, the dependence of the scientific aspects of vocational selection upon the actual progress of employment procedure makes it desirable to sketch, in barest outline, the developments in industrial employment practice before we proceed to a more detailed discussion of the work that has been done on separate phases of the employment problem. Secondly, it is to be noticed that since the literature dealing with employment

[1] In addition to these topics specifically excluded, a large number of references are omitted which contain borderline material or material that was considered relatively unimportant for the present purpose. There have doubtless also occurred certain unintentional omissions of articles that should properly have a place. Especially as regards contributions not written in English, the review makes no attempt at completeness.

is almost boundless—much of it composed of popular and semi-popular discussions or reports of procedure—no attempt is made to include a large part of it. Rather the policy has been to mention a few of the more representative and significant discussions on the practical side of the several topics treated.

Recent History and Present Status of Vocational Selection in Industry

Employment methods have been undergoing a profound change during the last decade, a change which is best summarized in the expression "functionalized and centralized employment". Scientific management, with its emphasis upon specialization and the separation of the various managerial functions, paved the way for the entrance of functionalized employment. The hiring and firing activities which were formerly the prerogative of individual foremen have, in an increasing number of plants, been taken out of the hands of foremen and concentrated under a staff department which deals exclusively with personnel duties (of which hiring is usually the most important). Centralized hiring necessitates the development of two bodies of basic knowledge—a knowledge of the requirements of the tasks for which men are being selected and a knowledge of the equipment of the individual worker. In the days of foreman hiring the need for written standardized job specifications was not felt, nor was the need for technical devices for determining men's abilities. Each foreman knew at first hand the jobs for which he was selecting men. Likewise he could crudely ascertain the applicant's trade skill by asking questions or, as was more usual, by "trying him out". Since records of turnover and employment costs were not kept and since labor was ordinarily plentiful, it mattered little how effective the selection procedure proved. All this changes when costs and records are kept, when one centralized department is responsible for efficient selection, and when the importance of having "the right man in the right place" has once been appreciated.

Centralized employment, then, has emphasized the value of knowing the requirements of jobs and knowing how to determine the qualifications of men. The scientific (may we say psychological?) attack upon this twofold problem, so far as vocational *selection* is concerned, is scarcely a decade old. The pioneer book in the field was Münsterberg's *Psychology and Industrial Efficiency* (99) which appeared in 1913. (Substantially the same book ap-

peared in German the preceding year (98).) The problems of vocational selection, it is true, had been prominent before this time among engineers in the field of scientific management (37, 49, 156), in the vocational guidance literature (20, 100, 112, 126), and within some few industrial plants. A small group of employment managers had begun meeting in Boston as early as 1910. But in none of these quarters had an effective effort been made to deal with the problems of vocational selection in any careful and scientific manner. (One exception is on record in the work of Thompson as reported by Taylor (156).)

Aside from Münsterberg's book, probably the most important one for the development of a "psychology of vocational selection" that appeared before the war was Blackford and Newcomb's *The Job, The Man, The Boss* (17). In spite of the unscientific character analysis methods it included, this book proved distinctly valuable in that it drew attention to the selection problem as it appears in its entirety to the employer, with healthy emphasis upon the human side of scientific management and upon individual differences and their utilization.

During the war remarkable progress was made in meeting selection problems both in the armies and in industry, principally though by no means exclusively in the United States. The direction of progress in the industrial use of psychological methods of selection is illustrated by a comparison of Münsterberg (99) with Hollingworth (59) and still more recently and strikingly with Link (83). The development is well reported in the committee reports of the National Association of Corporation Schools (104, 105, 106, 107, 108). More and more emphasis is placed upon the use of quantitative methods, upon the importance of the job analysis side of the problem, and upon a broad consideration of employment policies and methods in relation to business management and labor problems. In the United States Army unparalleled advances were made (in no small measure by professional psychologists) all along the line of scientific selection—studies of occupational requirements, methods of interview, use of general intelligence tests, special vocational tests, trade proficiency tests, rating scales, and records of individual qualifications and progress. Valuable accounts of these achievements are to be found in official reports (117, 178) and in a number of special articles (14, 163, 180, 181, 182).

The personnel movement in American industry began its period of rapid growth about 1916, favored by the unusual expansion

of industry and the unprecedented mobility of labor during the following few years. Leaders in the labor management movement have consistently had as one, if not *the* one, of their major interests, the development of scientific methods of selecting workers. The nature of the research and administrative activities in the field of industrial personnel during these years is reflected in the Proceedings of the Employment Managers' Conferences (121, 122, 123, 124, 125) and in the annual reports of the National Association of Corporation Schools (104, 105, 106, 107, 108), in the papers collected by Bloomfield (18), and in such studies as Kelly's *Hiring the Worker* (68).

In the years immediately following the war personnel work continued its rapid expansion and many psychologists (as well as social workers, teachers, and preachers) entered industry as personnel experts, as consultants, or as students in pursuit of special researches. In part there has been an effort to bear to industry the torch of Army methods and in part the attempt has been to develop new tests and other employment devices. Much of this work has supplemented in a valuable way the practical procedures that had been developing in industry. The net result of the combined research and applied activities has been a decidedly significant body of material in scientific employment methods. The more important features of these industrial selection methods, bringing together the experience of the Army and of industry, are described in numerous special articles and in many of the recent books on employment and personnel, such as those of Tead and Metcalf (157), Shefferman (146), Frankel and Fleisher (43), Kelly (70), Simons (148), and, with more psychological emphasis, Link (83), Scott and Hayes (142), and Reilly (128).

In England during the last year or two a number of books have appeared in industrial psychology. Prominent among these are Muscio (101), Myers (102), Watts (171), Drever (35). Significant lectures and articles have also appeared by Burt (24), Pear (115), Watts (170, 172), and others. In the books cited, problems of selection do not play the disproportionately large part that has been true of the work of American psychologists in the industrial field. As regards selection, the English books have done little more than rewrite the American experiences in employment psychology from Münsterberg to Link. Watts (170, 172) and others have stressed the necessity for a broader analysis of men in selection than has been common, including a study of instinctive trends and of higher creative qualities.

In Germany, a group of psychologists have been tackling industrial problems in a thoroughgoing manner with their emphasis, however, more upon vocational guidance and training than upon selection. Some work, however, has been done on selection, tending to follow Münsterberg's precedent of using miniature representations of tasks and elementary analyses. A few of the more important studies and discussions that have been published are those of Moede (95, 96), Piorkowski (119, 120), Stern (152), Martens (90), and Lipmann and Stolzenberg (86). Brief notes on the recent work of industrial psychologists in Germany are contributed by Link (85) and Kitson (76).

Little work on selection methods appears to have been done in France, aside from valuable physiological researches and a few scattered studies such as that of Lahy (79).

During the past year in this country there has been comparatively slight progress in employment psychology as a direct result of the industrial conditions. "Selection psychologists" are suffering with other industrial groups during the depression in business. The wave of high labor turnover on which employment methods were wafted into prominence has broken and further development of hiring technique does not appear to flourish in the resultant spray. There can be little doubt, however, that the application of psychological methods to the selection of industrial workers has gained a permanent place in the increasingly important movement to regard the human element in business. A certain amount of "over-selling" of the possibilities of psychological selection must be lived down; a considerable body of unscientific work must be scrapped; a more vital grasp of the employment problem in its industrial setting must be obtained; a host of painstaking and thorough researches must be pushed to completion. The lean years of the business cycle, in other words, are but forcing a purification of the soul of industrial psychology. Recent months have brought real though not unadulterated blessings in the progress of scientific methods in vocational selection.

Analysis of the Requirements of Vocations

The foundations of job analysis for purposes of selection may be traced to two independent sources. On the one hand, the scientific management movement, with its devotion to increased efficiency, recognized the importance of knowing the requirements of the work in order that competent individuals might be selected

as workers. But no systematic attack upon job analysis is reported. The second source was that of vocational guidance. The early vocational bureaus developed discursive characterizations of the kind of individuals needed in various vocations but all these attempts were non-specific and, of course, not intended for vocational *selection*. Typical of these "vocational psychographs" are those of Parsons (112), Bloomfield (20), and many other workers, a number of whom are included in Part III of Bloomfield's readings (19). Ulrich (166) uses the same sort of method in describing the requirements for certain higher callings such as that of medicine. (The early work in vocational guidance and more recent advances are summarized by Brewer (22).) Münsterberg in his *Vocation and Learning* (100), although he uses an impressive psychological scaffolding for his occupational analyses, adds little to the preceding literature since he retains the loose and general qualitative descriptions. Schneider (135, 136) strikes a somewhat original chord by describing the requirements of jobs in a series of paired broad characteristics, as settled-roving, creative-imitative, etc., which, however, are open to the same criticisms of generality, non-quantitativeness, and questionable usefulness for selective purposes. Seashore (144) describes the detailed psychological abilities that seem to be required in singing but his method was not extended to industrial vocations. In *Psychology and Industrial Efficiency* (99), Münsterberg adds little to the discussions in the vocational guidance literature and confines himself in the main to the use of job analysis for test building purposes. In a later book (97) he omits all reference to the study of jobs.

The voices of these earlier writers come not from industrial plants but from vocational guidance offices, libraries, and armchairs. Nor was their work aimed at problems of selection, though it had a pronounced effect upon the later job analyses constructed more distinctly as aids in selection. Much of the literature is still compelled to speak in the same loose terms that were used by vocational counselors ten years ago (as is evident, for example, in a score of books and articles that give analyses of the requirements for salesmanship); there are still outcroppings of Münsterberg's tripartite division of requirements of jobs according to the thinking, feeling, and willing, categories; and Schneider's classification appears to be especially favored by later writers, though how these requirements are actually to be used in selection remains, to the reviewer, something of a mystery.

But the present status of job analysis is to be interpreted as due more definitely to another line of development. In a sense this second line is continuous with the scientific management influence already mentioned. We refer to the rise of centralized hiring in industrial plants. In the period preceding our entry into the war, studies of job requirements were beginning to be made in industry, aimed specifically at the selection problem. Blackford and Newcomb (17) view the analysis of jobs in definite relation to centralized employment procedure, although their actual analysis blank calls for general mental and physical requirements the determination of which has not been demonstrated to be possible. Among the early developments of job specifications in industry are those reported by Reilly (127, 129) and Burke (23), and among the somewhat later improvements in form, those of Hubbell (61) and Stearns (150). These men (and many others) succeeded in putting the descriptions of occupations into brief, fairly definite, systematic, and readily usable, form. The occupational description work in the United States Army (117, 155, 14) and the descriptions published by the United States Department of Labor (167) present important examples of the methods that were just budding in industry before 1917. More important, this work served as a tremendous advertising influence and example which led to much wider study of job requirements in industry.

Recent advances in methods and forms of occupational descriptions for hiring purposes are well summarized in a number of publications in the field of personnel work (70, 146, 157) and particularly in Meine (91), Link (83), reports of the National Association of Corporation Schools (107, 108) and of the Industrial Relations Association of America (63). The recent emphasis is decidedly upon the need for descriptions that are more definite and concise and standard; statements of requirements that are in quantitative and determinable terms; the analysis of requirements that are differentially characteristic of particular jobs. Descriptions of jobs for purposes of hiring have been strongly influenced by the admirably detailed and exact work in job study of Gilbreth (48), Merrick (92), Lichtner (81), and others. The desirability of quantitative and detailed statements of requirements is well illustrated by Kitson (77) using the example of the work of proofreading. Some writers, including Hollingworth (59) and Link (83), seem inclined to undervalue the importance of specifications other than those that can be stated in terms of test stand-

ards. In the literature of employment management, however, occupational descriptions are discussed primarily as aids to interviewers—memoranda to guide the interviewer in ascertaining qualifications and in describing opportunities to the applicant. Insofar as the required qualifications can be stated quantitatively as, for example, in test scores, this should be done, but a vast amount of additional essentially non-quantitative information exists which is and will, despite advances in test methods, continue to be an essential part of job specifications.

Analysis of the Qualifications of Applicants for Work

The Employment Interview and Aids in Interviewing.—In vocational selection, not a great deal that can be called psychological has been done toward making more adequate the common-sense methods of interviewing applicants and interpreting the information obtainable from application forms, letters of recommendation, and the like. Numerous reports of current employment office practice in books and conference proceedings contain useful information on these matters—based, however, upon opinions of employment managers and not upon any scientific determinations. A number of forms and methods that have proved valuable are presented by Kelly (68), Reilly (128), and Shefferman (146), including application forms, letters of inquiry, and interviewers' rating blanks.

One of the first clear statements of interviewing methods is that of Huey (62) in which several notes are sounded that have echoed through the later literature—the desirability of placing the applicant at ease, the importance of studying his appearance and manner, drawing out his interests and desires, weighing the facts of his personal history, rating (even though crudely) his character qualifications, and acquainting him with the essential features of the position for which he is being considered. Kelly (69) and Jones (66) emphasize many of the same factors but with more systematized methods of procedure. Avery (7) presents some keen and thoroughly behavioristic observations by which to interpret the applicant's actions and the information on the application form, but most of these are personal reactions and of doubtful validity. Link (83) strongly emphasizes the desirability of the interviewer's assuming the applicant's point of view. Scott (138, 140, 141, 27) stresses the value of considering the applicant's previous experience and judgments concerning the applicant made

by himself, by others who have known him, and by the interviewer. Standardized forms and methods are presented (27, 140) for more reliably obtaining these records and judgments. Fish (39) enumerates a variety of characteristics that should be determined in the applicant but methods for these determinations are not presented, unfortunately. In fact, this problem of judging personal characteristics has been sadly neglected save by proponents of systems of character analysis. Scott, however, has made a helpful contribution in the interviewers' rating scale (27) which at least calls forth explicit opinions on a variety of characteristics in place of the usual unanalyzed snap judgment. Certain methods found valuable in selecting men for particular work in the Navy are discussed by Stearns (151) who begins with the point of view of a psychiatrist and takes a sound well-rounded view in his study of candidates. The most careful and scientific classification of information concerning candidates and of methods for estimating a man's worth and usefulness were developed by the Committee on Classification of Personnel in the Army (14, 117, 182). These methods have been adapted to many industrial plants.

On the side of negative criticism of ordinary interview methods there are a few brief studies. Scott presents evidence in his Scientific Selection of Salesmen (139) of the unreliability of ordinary interview estimates of abilities. He had six executives interview independently 36 applicants and rank these candidates in order as to their ability for sales work with the company. Rather striking discrepancies occurred. Similar material collected by Scott is described by Gowin (53). Hollingworth (57) presents much the same sort of evidence demonstrating the unreliability of "size-ups" based upon letters written by applicants in response to advertisements. Other difficulties and criticisms having to do with the judging of applicants are discussed in connection with character analysis methods and with the use of rating scales.

In general it is true that we are not yet beyond the common-sense rule-of-thumb stage in the sizing up of applicants. Scott's (141) words of five years ago are still true: "Strange as it may seem, no standard practice has been evolved for conducting the interview in such fundamental features as the length of time devoted to an interview, the method of conducting it, the points to be looked for in the application, the standard scale for weighing the applicant, and the method of recording the interview."

Systems of Character Analysis.—Selecting men for jobs is a practical and urgent matter. Where scientific methods cannot

be used, common-sense methods and pseudo-science will be—and are. The interviewer, selecting men, desires to know something of the applicant's intellectual and physical capacities, his degree of proficiency in special lines, and also his moral characteristics, his volitional and non-intellectual traits. In the first two directions psychology has at least a method and a promise. As regards analysis of character and temperament, scientific psychology has perforce remained silent, except where it has been aggressively negative. In a few quarters, however, the problems are being tackled with increasingly encouraging results that may, in the not too remote future, be useful in vocational selection. (References to the work that has been done and good summaries are given by Allport (5). An unpublished thesis of M. J. Ream at the Carnegie Institute of Technology describes a valuable application of volitional and interest tests in the selection of salesmen.) Meanwhile systems of character analysis have flourished.

Most prominent of the systems of character analysis in the field of vocational selection have been those in which physiognomy and phrenology are the main ingredients, though some suggestions have also been made for the use of graphology (44), palmistry (93), etc. Doctor Katherine Blackford's method of character analysis (16) is far the most widely known and used. It is not greatly different in its essential nature from a number of other systems, as those of Merton (93), Balkin (9), McCormick (88), and others (41, 42). These systems make use of physical characteristics, for example, the form of profile, the complexion, texture of the skin, height of forehead, and so on, as indications by which to determine moral qualities and personality traits.

The adverse criticism of these methods divides into four charges: (1) The physical observations themselves are inaccurate and unreliable. (2) No scientifically valid evidence has been adduced in support of the alleged relations between the physical and mental characteristics. (3) The theoretical bases are unsound. (4) Estimations of characteristics from photographs under experimental conditions have shown highly unreliable results. Evidence on the first count is presented, for example, by Goring (52) by showing the inaccuracy of estimates of height of forehead. But this criticism is not applicable to many of the cues used by the character analyst. The second criticism is the only forcefully valid one. Objections on the ground that character analysis makes theoretical assumptions that are false (emphasized, for example,

by Hollingworth (59), Link (83), Adams (2, 3), Gowin (53), Payne (114)) give ground for justified scepticism but, after all, leave untouched the *practical* question as to whether correct character readings are made. Character analysts might conceivably be entirely wrong as to causal explanations and still have described actually diagnostic signs. A geocentric theory of the solar system makes no less valuable the prediction that the sun will rise each morning in the East. Experimental studies to date are likewise not at all rigidly convincing since the claims of character analysis have in no case been specifically put to the test. The reviewer has no thought of defending the popular systems of character analysis. It is maintained, however, that only by the same rigorously scientific processes used in examining one another's hypotheses, can scientific men satisfactorily deal with strange doctrines from without. Character analysts allege certain factual relationships to obtain. The disproof (and from a *practical* point of view disproof seems worth while) must consist in careful measurements and statistical correlations demonstrating the non-existence of those relationships.

Various bits of experimental and statistical research have presented presumptive evidence against character analysis methods, in addition, of course, to the anatomical and biological attack on the underlying assumptions. Schneider is cited by Hollingworth (59) as reporting that an examination of executives showed no relation of abilities with physical characteristics such as shape of head and hands. Pearson (116) found that the relationship was not close enough to make safe practical predictions from various head measurements, hair and eye color, etc., to intelligence. Experimental studies to determine the reliability of character trait estimates and intelligence estimates from photographs are reported by Hollingworth (59), Pintner (118), and Anderson (6). The general indication of all the studies is that judgments from photographs are markedly inaccurate and show very slight agreement with other measures of ability.

Kemble (72) is midway between the character analysts and psychologists. He emphasizes the value of an unanalyzed "size up" of the face but he thinks that this may valuably be supplemented by interpretations of specific muscular tensions of the face and the imprint of habitual tensions in facial lines. There is little in his proposed methods with which psychologists would quarrel on a priori grounds. His statistical evidence, however, is meagre and unconvincing.

Psychological Tests.[1]—The most distinctively psychological contribution to vocational selection has been the development of tests. Tests as selective devices have been especially popular since the war —too popular perhaps. Before 1917 vocational tests were a hope, an interesting possibility, with, it is true, a few scattered pieces of research as a basis. The war gave a radically changed status to test work and made practicable much of what had been merely possible. After the armistice (as well as before in a very few instances) tests and testers invaded industry. Progress has been made slowly. Selective tests adapted to industry are still few; the movement is still immature; future possibilities are still uncertain. This is entirely healthy and normal if we recall the recency of the birth of scientific vocational selection. The danger—the aspect that is not healthy or promising—is the "over-selling" of tests, the tendency to dwell upon advantages and successes and gloss over defects and failures, the tendency to speak of selective tests as an accomplished fact and not as a valuable field for experiment. Perhaps that is the only way to induce the business world to try out test methods. Perhaps the goal of getting a foothold in industry justifies the means of gentlemanly exaggeration. But it is not science. And it is dangerous.

A few of the great number of discussions of tests for vocational selection which emphasize the need and desirability of using tests in employment (it is not implied that these are instances of "over-selling") are those of Hollingworth (57), Ruml (134), Yerkes (179), Rossy (132), Viteles (168), Lamb (80), and Gardener (46). The last two report the successful use of tests in a New England silk mill. In some of the articles mentioned, as well as in others, the limitations of tests and the dangers in their unscientific use are emphasized, for example, in Scott (138), Ruml (134), Link (83), Watts (170). Similarly, the limitations upon the use of tests for vocational guidance have been discussed by several writers, including Ayres (8), Whipple (175), and Kitson (75). Very few writers (Thorndike is a notable exception) have considered the problem of coaching for tests—a problem that threatens to become increasingly important with the wider adoption of tests. A partial solution lies evidently in the use of equivalent alternative forms of tests.

[1] No descriptions of tests are included nor are the particular tests used by different investigators enumerated. The mere naming of tests has little value and space prevents their description, even were this deemed desirable.

Reports of actual accomplishment through the use of tests in vocational selection are not plentiful. Nor, for the most part, do they do more than convince one that here is a fruitful field for research. For a few occupations in a few companies, tests have been of demonstrated value. This gives promise. But the evidence is scant. In view of this condition it appears particularly unfortunate that a considerable body of scientific work on vocational tests carried forward by private companies and special research bureaus has never been published. The last report of the Committee on the Application of Psychological Tests and Rating Scales in Industry of the National Association of Corporation Training (108) states that 35 of the 172 companies questioned reported that they are using standardized tests of one kind or another for employment purposes. (The 172 companies are, of course, not a random sample of all companies.) Preceding reports have shown almost as many. Little, indeed, of this work has been scientifically evaluated and reported.

To further a healthy growth of tests in employment, there is need for as much convincing evidence as can be assembled. This means: (1) the publication of actual results from all sources, showing just how well the tests have operated in particular situations; (2) the non-suppression of negative results which are all too frequently doomed by the constant bias that tests *must* work, or reflect upon the experimenter; (3) the adoption of a more critical scientific attitude in place of the tone of special pleading apparent in part of the literature; (4) the use of more nearly justifiable statistical procedure and the more cautious interpretation of statistical findings.

Only the last of these four points merits an additional word. Passing over certain questionable procedures such as the use of correlations of attenuation when working with test predictions (used, for example, by Burtt (25)) and the uncritical use of multiple correlation without mention of the large error to which it is subject (as used, for example, by Thurstone (165) and Bregman (21)), we wish to stress one frequent and specially favored statistical fallacy. In general terms, it is the interpreting of a relationship found in a selected group as true of a non-selected group. Specifically, it usually takes the form of establishing a correlation on a small group chosen in such a manner as to be non-representative of a larger group, and using the results as though they applied to the larger group. Scott (139), for example, in comparing test

scores with efficiency ratings for 26 employees in a silk mill, selects the men as follows: "Of all the men at work at the task it was desired to have tested about 10 who were extremely efficient, about 10 who were distinctly unfit for the task, and about 10 who were intermediate between these extremes." The correlation coefficient of firm rank with test rank was .88. But who can interpret the .88? Certainly it does not tell how reliably men can be selected for this work from a random sample of applicants. And that is what is wanted. In a later paper (137) Scott outlines this same procedure as a generally desirable method. It *is* desirable if our end be to obtain high coefficients. If the middle group in the example had been omitted and only the 10 at each extreme taken, the correlation might well have been .98. This is precisely what Bregman (21) has done. She selected from a group of department store workers those who were rated at the good and poor extremes and found single tests that correlated as high as .83 (using the "unlike signs method" moreover!). But on a vastly larger scale the Army Trade Test Division used the same sort of method, though in a less uncritical manner. These are but a few examples. The whole matter, on the positive side, may be summarized as follows: The conditions of try-out of a selective test and the nature of the group used should be as nearly as possible identical with the conditions and the group with regard to which the test is to be used in actual practice. The reason is obvious. A test may successfully separate the upper extreme of a group from the lower extreme (Scott's and Bregman's method) and still be of very slight value in separating the upper or lower extreme from the large intermediate assortment. Concretely, a test may separate extremely good salespersons from extremely poor ones and yet not be a test worth using. The real question is: How well does this test enable me to select good and poor salesmen from the general run of applicants. The answer can be obtained only by trying out the test on a group that is more or less nearly identical with a group of applicants.

A practice somewhat related to that just discussed is the interpreting of correlation coefficients without sufficient basis for interpretation. For test purposes, a coefficient of correlation is of use as an indicator of the reliability of prediction with the use of the test. It tells its story for a particular situation. But Hollingworth and Poffenberger (60), to cite only one example, fill a page and a half with tables of the correlations found with the

use of different tests for different occupations by many different investigators with entirely different groups of workers. The correlations range from .32 between ability as "specialized operators" and color naming test scores, to .96 between ability as "typewriters" and scores in letter substitution!

Tests of General Ability.—In discussing the vocational use of tests we may for convenience divide them into those of general ability (general intelligence, mental alertness, etc.), those of special ability as required by a particular job, and those of trade or occupational proficiency. The lines are not, of course, sharply drawn and in special instances the classification of a test as general or special, proficiency or ability, is almost purely arbitrary.

The history of tests of general ability or intelligence aside from their use in vocational selection need not concern us here. Before 1916 these tests had not been used to any considerable extent save in work with the abnormal and feeble-minded, and in a few special research studies most of which had no bearing at all upon vocational selection. One study, however, is to be mentioned. Woolley and Fischer (176) in 1914 published test results for some 800 adolescent children who were about to enter industrial employment. The tests used and the norms that were given aided in later developments though not of themselves significant for selection since no relations were presented between test scores and industrial success. Revisions of the Binet-Simon tests by Yerkes and Terman led to greatly increased application of test methods among normal people, especially in the schools. But the most significant advances in test methods as far as industry is concerned, which were made before the work in the Army, were the few attempts to construct fool-proof tests that could be administered to groups as well as to individuals, by relatively unskilled examiners, and that could be readily and objectively scored. Work along these lines had been developed by Scott, Thorndike, Thurstone, Otis, and others.

General ability tests took a tremendous leap forward with the coöperative effort of American psychologists to adapt test methods for use in the United States Army. The development and use of intelligence tests in the Army have been reported in a preliminary form by Yoakum and Yerkes (177); in an official volume edited by Yerkes (178), which contains a detailed history and description of the army test work and a wealth of well-ordered data showing test scores in relation to military rank, age, occupation, nativity, etc.; and in a large number of special articles among which may

be mentioned those of Yerkes (179, 180), Terman (159), Thorndike (163), Ruml (134), and articles in *Science* (183). The intelligence test ratings in the Army were used to furnish "a fairly reliable index of his (the soldier's) ability to learn, to think quickly and accurately, to analyze a situation, to maintain a state of mental alertness, and to comprehend and follow instructions". The value of the tests was checked by many special studies and comparisons. In actual practice the tests were used to select the mentally incompetent for special duty or discharge, to designate men whose superior intelligence indicated the desirability of advancement or special assignment, to provide a basis for balancing military units, and to make various special selections and assignments of men according to ability.

The primary suggestions of the Army work as regards industrial selection are along two lines: (1) Intelligence tests can be successfully used (*a*) to eliminate low-grade workers from industrial tasks where they would be dangerous or incompetent, and (*b*) to call to the attention of management, men of exceptional alertness. (2) Striking and significant differences were found in the range of test scores for different occupations. For example, medical officers, accountants, mechanical draftsmen had average ratings of B; clerks, telegraphers, etc., had averages of C+; machinists, carpenters, and other skilled tradesmen averaged C; laborers, barbers, etc., averaged C−. It seems likely that the alpha test especially favored persons with academic training and those having "pencil and paper" occupations. In any case, the significance of these differences for vocational selection is that they point to the possibility of establishing standards for different occupations. In and of themselves they are of no direct value in selection since the great amount of overlapping of scores from one occupation to another is no less striking than the fact that the averages are different.

The Army tests and a number of similar intelligence or mental alertness tests have been put into use in employment offices. Thirty-two of the 172 companies questioned by the National Association of Corporation Training (108) were using such tests. The tests are used to select individuals of the appropriate level of ability and to indicate ones who are too high or too low for the work considered. Standards are usually set, when set at all, by reference to the degree of efficiency on the job of individuals making different test scores. Kenagy (73) reports some interesting data

showing how intelligence test standards may be set with reference to labor turnover. It was found that the length of service of individuals above a certain test score was decidedly shorter than that of lower grade persons and similarly, below a certain dead line, length of service was low. The same sort of method is described in one of the Scott Company Bulletins (143). The use of intelligence tests has been confined in the main to office employees and salesmen. The use of these tests for definite occupations, we shall consider in our discussions of special tests for particular jobs since, although in form these tests are ones of general intelligence, in standardization and use they have been treated as tests for definite jobs.[1]

Tests of Special Ability for Particular Work.—Special tests for particular jobs came into prominence as a possible method of vocational selection with the experiments of Münsterberg (99) though the way had been indicated by a few earlier pieces of work. A number of studies aiming to devise tests for special vocations have been made since these beginnings. There has also been some discussion of the technique of building these vocational tests. Münsterberg (99), Hollingworth (58, 59), Muscio (101), and Watts (170) are among those who have dealt most with the relations existing between the test and the job tested for, classifying the tests, for example, as Hollingworth does, into the four kinds: miniature representations of the job, samples of the job, analogues of the job, and tests chosen empirically with no obvious relation to the job. Hollingworth favors the last method. Typically, however, the empirical procedure begins with "hunches" that fall into one of the other classes. Watts (170, 172) argues vigorously against both the empirical method and the sample method, maintaining that "where intelligence as well as specific aptitude is necessary the analogous test is needed"—at least, he thinks, until we can form accurate psychographs for occupations.

Scott (137), Hollingworth (59), Link (83), reports of the National Association of Corporation Schools (106, 107, 108), and many other contributions have dealt with the methods of trying out and standardizing tests for particular jobs. Scott has outlined four methods of checking test results, as follows: (1) By comparison of test scores of present employees with rankings by executives;

[1] The reviewer is of the opinion that in our present state of ignorance regarding what a test tests, the part of wisdom is to call any test that proves valuable in selecting for a particular job, a test of the special abilities required by that job.

(2) By seeing if the scores of men of proved ability are high in comparison with those of applicants tested at the same time; (3) By comparison of test scores of applicants with their later accomplishments; (4) By comparison of a group of applicants with a group of employees who have succeeded. As to the distinction between (2) and (4), we are not clear. The first and third methods are the ones commonly used and advocated, if we include in (1) comparisons of scores with production records as well as with employers' estimates (and modify Scott's statement of the method of selecting the group). The consensus of opinion appears to be that, with proper safeguards, the third method is most desirable, since it most nearly measures precisely that relationship which is involved in predictions when the test is put to practical use.

Tests for particular jobs, as they are developed to date, may be considered in five groups: (1) tests for clerical and office workers; (2) tests for factory workers; (3) tests for salespersons; (4) tests for aviators and other military vocations; (5) miscellaneous special tests.

1. The tests for clerical workers described in the literature are in the main either intelligence tests or proficiency tests, although a few attempts have been made to devise special vocational tests to detect aptitude for particular lines of clerical work. The successful use of intelligence tests is reported by Scott and Hayes (**142**) though they present no actual data showing the value of the tests for selection. (Several bulletins of the Scott Company (**143**) contain such data.) Thurstone (**165**) advances the proposition that a special clerical test is, and should be, only a general intelligence test dressed in clerical language for the sake of the interest appeal. He describes a test of this sort and reports results obtained from 100 office workers who ranged from minor executives to young clerks. The correlation coefficient between grade of work (five grades were used) and test score (speed and accuracy combined by the use of multiple correlation) is .6. This tells little if anything about the value of the test for purposes of selecting from among applicants. It is significant, however, that the test is more closely related to grade of work than are age and schooling combined. Link (**82, 83**) is convinced that differential tests of special ability are required for the several kinds of clerical work, although he gives no evidence that better results may be obtained in this way than by the use of general tests. Both Link (**83**) and Scott and Hayes (**142**) show differences in average test scores

from one office group to another. The value of such averages is doubtful, since the overlapping of groups is so great as to preclude the possibility of making reliable individual predictions on the basis of the averages.

Link (83) reports that 935 clerks were tested in the employment office of an industrial firm, with a series of intelligence tests and tests for technique (card sorting, letter substitution, arithmetic, etc.) and follow-up reports obtained. Only 188 cases are discussed. These were clerks recommended on the basis of the tests and then followed up every month for three months. The tabulation given is:

Percentage of those called good by their superiors:
At the end of 1 mo..... 75 per cent.
At the end of 2 mo..... 89 per cent.
At the end of 3 mo..... 92 per cent.

The size of these per cents means little since they depend upon the method of rating and the kindliness of the superiors. The increases from month to month, however, are significant. Tests for typists, stenographers, and calculating machine operators are also reported by Link. More than 1,000 people were tested in the construction of these tests. Both tests of aptitude or ability and tests of proficiency were used. Results for typists and stenographers are not given, and only a few comptometer operators (in the calculating machine group) are reported upon. The tests in each instance, however, were deemed of sufficient value to be adopted for use in employment.

Among the earliest attempts to build tests for ability in special clerical occupations are those of Lahy (79), who tried out a variety of psycho-physical tests on typists and found a few of these tests that showed rather close agreement with typing ability, and those of Lough (87), who correlated scores on a substitution test with the abilities shown by commercial students in their several school studies and found fairly high correlations with typing, business correspondence, and stenography. A number of later studies have been made along more or less similar lines. Bills (12, 13), who used a series of tests on 139 students of comptometry and stenography in a technical night school, found a general intelligence test decidedly valuable in eliminating the failures and a special ability test in selecting the successful students. The tests were later found

to agree well with ratings of ability of two small groups of stenographers in a business concern. The method used by Bills is especially worthy of note. Scatter diagrams are plotted between scores on two tests, and the ratings of individuals according to the criterion are shown by different markings (as circles and crosses for successes and failures respectively) on the scatter sheet. It is then possible to draw two dead-lines and study the combined effect. This study also emphasizes the fact that different tests may be useful for predicting at different levels of ability. Bregman (21) reports the use of a long series of tests on a decidedly heterogeneous group of clerical workers in a department store, using only the extremes of the group. Some relationship of tests to ability is indicated but the correlation coefficients, as already pointed out, mean nothing.[1] Rogers (131) tried out 10 tests on 43 students of typing and stenography and compared these with typing tests during the training period and with instructor's estimates. Combinations of tests gave correlations of about .5 and .6. Jacques (64) reports some further work of Rogers on typists in a business firm. Several psychological tests (not proficiency tests) were found to correlate closely with the ability of 38 typists. No data are presented.

Cody (32) presents a long series of tests—all of them educational or proficiency tests—for office workers. The tests are for almost all the usual operations in a business office. They have been standardized among thousands of school students and office employees, but the author includes no statistical comparisons with criteria nor any measures at all save the average scores for different groups tested. Benge (11) developed a proficiency test for extenders and verifiers in a city gas company. Henderschott and Weakley (55) devised and tried out a test for billers and found fair agreement with estimated ability (though the fallacy of the selected group is again present). Marcus (89) developed a series of tests for Hollerith card punchers, which proved to be considerably more valuable in predicting ability than the civil service examination that had been in use, though even with the new tests the correlations coefficients do not appear to be large. Carney (28), experimenting with a large number of tests for selecting time clerks, obtained only a few fairly close cases of agreement between tests and competence on the job. Flanders (40) found no significant correlation between scores on an intelligence test by express

[1] Further aspects of this work are discussed under tests for salespeople.

clerks and their success at work. Wells (174) developed a test for file clerks but did not proceed with its standardization. Burtt (25) used 10 tests on a group of general clerical workers but insufficient information is given to show what the obtained correlation coefficient of .56 means.

2. Only a few instances are reported in the literature of tests that were tried out for factory workers. Link's (83, 84) work in the Winchester Repeating Arms Co. is the outstanding example of thoroughgoing scientific test procedure in factory or workshop. Similar, but less extensive, research was later conducted in a Canadian rubber company by Burtt (25).

Link (83, 84) describes in considerable detail the construction and standardization of special tests for five different occupational groups in the shop. In each instance a careful study is first made of the requirements of the work; then a series of tests is tried out; comparisons are made between test scores and some measure of working efficiency—production records where available and otherwise estimates by superiors. Sixteen tests, for example, were tried for shell inspectors, three of which proved especially diagnostic, giving correlations of .6 and .7 for a group of 52 inspectors. These tests were almost equally valuable for three other groups of inspectors doing highly similar work. Follow-up reports of applicants who had been tested also showed that the tests were operating effectively. The same tests were found to be very poor for selecting shell gaugers. A series of tests for assemblers of gun parts, tried with small groups of men and women assemblers, was found fairly satisfactory. A valuable test was devised and standardized for classifying a group of machine operators according to ability. And finally, tests for apprentice machinists were found which correlated very closely with estimates of ability for three small groups of apprentices.

Burtt (25) used 32 different tests on several groups of workers. He does not mention the number of people in any of his groups. Correlations of tests with ratings of ability (using multiple correlation procedure and corrections for attenuation) ranged from .7 for "workers who hand out stock" to almost zero for "tire builders". With 400 workers in a silk mill, Otis (111) found no correlation between general intelligence test scores and ability at work. Thompson's very early work, reported by Taylor (156), consisted in the selection of inspectors of ball bearings by means of a reaction time test. Remarkably valuable practical results were obtained,

35 of the selected individuals doing the work that 120 unselected ones had been performing.[1]

3. On the selection of salesmen even less test research has been reported than in the case of factory workers. Scott (139) published a little material on the selection of salesmen by tests as far back as 1915. He reports the use of an intelligence test including arithmetic, opposites, proverbs, directions, etc., with 10 travelling salesmen of a large tobacco company. The results are not unequivocal but show some agreement between test scores and sales records. A later series of tests for salesmen worked out under Scott's supervision is included in the Aids in Selecting Salesmen, of the Bureau of Salesmanship Research at Carnegie Institute of Technology (27). No results have been reported from the use of these tests. Further advances in tests for selecting salesmen, especially life insurance salesmen, have been made at Carnegie Institute of Technology but are not yet published.

In the field of retail salesmanship, also, certain tests have been developed at Carnegie Institute of Technology and tried out in department stores in Pittsburgh. The only published results concerning retail sales tests, however, are those of Oschrin-Bregman (21, 110). In the main study reported, very high *negative* correlations were gotten between scores on a variety of mental tests and ratings of ability of some 50 salespersons by their superiors. Only the direction and not the size of the coefficients is significant due to the way in which the groups were selected and the correlations calculated. A number of other statistical processes are used in this study which appear to the reviewer unwarranted and misleading. The same writer, moreover, had arrived at opposite conclusions in an earlier study (110) where she found high *positive* coefficients of correlation between the estimates of ability of 18 saleswomen and the scores on a series of tests. The earlier results are not reconsidered in the later study. Burtt (26), reporting some results from data collected by Münsterberg, presents evidence that at least one of a number of tests tried on Harvard students and on several industrial groups is diagnostic of salesmanship ability. Hollingworth and Poffenberger (60) present some average scores in comparison with salaries for a group of 55 salesmen "engaged in selling all manner of commodities in all manner of ways. . . ". They found some tendency for higher scores and higher salaries to go together.

[1] Other changes, however, were simultaneously introduced, making it impossible to say definitely what part of the gain was due to the tests.

4. Far more effort has gone into the study of aviation from the point of view of vocational selection than into any other single occupation, military or civil.[1] The principal results of American research are described in a number of articles (4, 34, 36, 56, 153, 154, 163, 181), and certain prominent features of European investigations are summarized by Dockeray and Isaacs (34) and touched upon by Stratton (153). Elaborate physical examinations and painstaking interviewing methods had been used in selecting aviation candidates from the beginning, but the predictions of future success had proved sufficiently unreliable to warrant intensive research on the problem by psychologists as well as by physiologists and medical men. Despite the tremendous difficulties involved in analyzing the abilities that enter into aviation and the corresponding difficulties of determining these capacities, considerable success was attained. Mental alertness tests and evaluations of a variety of personal information concerning the applicant were shown to be useful, on the one hand, and a number of psycho-physical tests were evolved to supplement these and get at the candidate's probable ability to fly and to endure such special conditions as partial asphyxiation. Correlation statistics presented by Henmon (56) and by Stratton, McComas, Coover, and Bagby (154) show rather low coefficients between scores on several tests and ratings of flying ability, but not so low as to be without promise. The latest report of research (154) in which a number of tests were used, both ones that had been found useful before and a number of new ones, concludes that: "The tests, as a whole, and some of them singly, are to some extent diagnostic. Their precise value, however, can be known only after trial under more favorable conditions."

Careful experimental studies were made of other military and naval tasks, one or two examples of which are briefly to be noted. Dodge, in a report edited by Yerkes (181), describes the methods he developed which proved extraordinarily valuable in the United States Navy for the selection and training of gun-pointers by means of specially constructed apparatus. He tells also of the tests devised for selecting recruits of relative fitness for plotting room service and of the comprehensive system of examinations of candidates for the Listeners' School in the Navy. In all these re-

[1] A great number of articles on aviation and the selection of aviators are available in both English and foreign languages. The present review omits all but a few references in this field since it is somewhat aside from the main line of vocational selection.

searches Dodge states that he followed "the general principle of using a replica of the actual task for test purposes instead of any presumptively correlated tasks". Myers (103) reports, without details, work along somewhat similar lines in the tests developed for the British Navy to select candidates for training in hydrophone listening. Ferree and Rand (38) present a few general conclusions from their experimental research on tests of vision for men in the look-out and signal service in the Navy.

5. Tests have been tried for a number of occupations other than those we have discussed. Münsterberg (99) very early devised his well-known tests for street car motormen, telephone operators, and ship officers. These tests, he states, "show a far-reaching correspondence" and "satisfactory agreement" with other measures of efficiency, but the data in support of the statement are not submitted. Goldman (51) summarizes this work of Münsterberg and indulges in some criticisms which are of doubtful value. Gerhardt (47) reports the use of some methods for selecting street car motormen in Dallas, including unstandardized psychological tests which are stated to have shown good agreement with the men's records. Burtt (26) reports the results of 13 tests which Münsterberg had devised and tried out shortly before his death. The tests were given to six groups, collegiate and business, and attempts made to find tests particularly diagnostic of salesmanship ability, executive ability, and inventive ability. Since in the group of Harvard students these abilities were obtained as estimates of self, and since the business groups were very small, the findings are admitted to be tentative. At least one of the tests appears to be of value in predicting salesmanship and one for executive ability.

Seashore reported the beginning of his work on methods of determining musical ability in 1912 (144) and has made several valuable contributions at later dates. In his *Psychology of Musical Talent* (145), an elaborate array of tests arrived at through detailed laboratory experimentation is described for measuring the special abilities involved in music. No statistical data are presented in support of the tests. Watts (170) criticizes Seashore's method principally on the grounds that the complex interrelation of many factors precludes the possibility of their proper measurement and combination for use in vocational selection.

Terman (158) gives the results from the testing of 30 candidates for positions as policemen and firemen, with the use of the Stanford-

Binet examination and a series of pedagogical tests. As no criterion was available, the work has little significance for vocational selection. Freyd (45) describes a set of ingenious tests for journalistic aptitude and the results obtained when the tests were given to groups of students of journalism and to a few reporters. The group comparisons and the correlations with faculty ratings indicate that the test is effective. Jones (65) gave the Woolley test series to 22 boys studying telegraphy in a continuation school. A selected set of six tests was found that correlated to the extent of .8 with a ranking of ability made by the teacher of telegraphy at the end of an eight months' training course. The correlation between test scores and the ranking by employers (all worked for the same firm), of the boys' abilities as messengers, was almost zero. Thurstone (164) tried out eight tests on a group of 165 drafted men in a course in radio-telegraphy and compared the test scores with records of receiving speed. The highest correlation coefficient found was .48, with the use of an original "rhythm test". Intelligence tests correlated less closely. Kemble (72) describes a large number of tests for determining ability and classifying men—executives as well as men of lower grade—but he presents almost no evidence of the value of the tests, nor does he tell how they were standardized or what norms are to be used. The nature of his test work is indicated by his statement that "We have already arrived at the point where we can pick with rarely failing mathematical precision the right person for the right job. . . ". In discussing the selection of executives, Gowin (53) cites other work of Kemble and also describes a minor experiment by Scott in which 19 executives of Cheney Bros. were rated by mental tests in almost exact correspondence with their ratings by the president of the company. Link (83), however, is convinced that it is "impossible to apply tests intelligently to executives in the higher and more specialized positions".

Tests of Trade Proficiency.—Discussions of trade tests are limited almost entirely to reports of the Army work, with a great deal of optimistic emphasis upon the desirability of extending this work to industry. Valuable descriptions of army trade test methods are contained in the Personnel System of the United States Army (117), Chapman (30), Bawden (10), Bingham (15), Reilly (128), Ruml (134), and in an article in the PSYCHOLOGICAL BULLETIN (182). Trade tests were used in the army to determine whether men were tradesmen in the lines in which they claimed skill, and

approximately their grade of proficiency. Oral and picture tests were used that consisted of carefully sifted and standardized sets of questions upon which the candidate could be rated. In some few trades, performance tests were available which required the candidate to perform some definitely specified task that was typical of his trade, a rating being assigned according to the excellence of the completed product and the time required. All the tests were tried out on groups of tradesmen in industry and evaluated by comparison with the known ability of these men.

Little has been added to the trade test work of the Army. Chapman and Toops (31) describe a written trade test that has the obvious advantages of a group test. Their statistical evidence is favorable though the nature of the group prevents its being considered conclusive. Chapman (30) discusses the adaptations of army trade tests used experimentally in the public employment bureaus. Brief standardized trade interviews were tried for a time, but for the practical needs of the situation unstandardized "selective trade interviews" were later adopted. Robinson (130) contributes a logical analysis of trade ability which makes explicit certain less evident features of the Army trade test method. Kelly (71) also discusses some basic considerations in connection with trade tests. Kornhauser and Ruml (78) point out some statistical difficulties of the Army trade test method and present a possible substitute. The use of trade tests in industry is discussed by a number of writers, including Bingham (15), Chapman (30), Ruml (134), Watson (169), Weaver (173). Link (83) views trade tests as an integral part of the interview and appears to give them rather scanty attention in comparison with that bestowed upon special ability tests. The actual use of trade tests in industry is scarcely mentioned in the literature. Proficiency tests for stenographers and typists have already been touched upon. Adaptations of trade tests to the selection of department store salespeople, according to their knowledge of merchandise, are reported in bulletins of the Scott Company (143). In regard to trade tests as well as in the case of ability tests, it appears that much of the work going forward has not been evaluated and reported, for the 1921 report of the National Association of Corporation Training (108) states that 26 companies use occupational tests and 25 use educational tests.

Analysis of the Qualifications of Workers Already Employed

Vocational selection may be, and frequently is, concerned with selection from among employees already at work. For such selection, a prime requisite is a set of adequate records containing the information that has been obtained concerning the man during his period of employment. (Tests and other devices are, of course, useful in addition.) These records can conveniently be considered as of two kinds: (1) ratings of the individual's characteristics and efficiency, typically by his foreman or other executive, and (2) progress records including some measure of output, attendance, previous promotions, wage changes, etc.

Rating Scales.—Strangely enough, the rating scale first became widely known in the vocational world as an aid to interviewers in recording their judgments of new applicants (27), though its later history deals entirely with its more obvious use as a method for estimating characteristics of individuals with whom the rating official is acquainted. Rating scales, like most other personnel devices, sprang into prominence as a result of their widespread use in Army personnel work. The rating method which Scott and his associates had developed was adapted to Army needs and became the official method throughout the United States Army by which superior officers rated their subordinate officers. The Army system of rating is described at length in the Personnel System of the United States Army (117), in a bulletin by Reilly (128), in a report of the National Association of Corporation Schools (105), in an unsigned article (182), and in many special articles and books on personnel methods. The use of the Army rating scale involves the making of quantitative estimates of a man's ability in several more or less specific qualities. The ratings are assigned—and this is the most distinctive feature of the method—by a direct comparison of the individual to be rated with other individuals of known ability, whose names have been set down in advance as standards or inch marks on the rating yard stick. This man-to-man comparison scale has been widely adapted to industrial use. Paterson and Ruml (113) discuss certain improvements in the use of this scale and point out the values it has in industry. Rugg (133) finds that the scale probably did not reliably locate army officers within even the correct fifth of the scale. He suggests several conditions as prerequisite to the successful operation of the scale.

Many other forms of rating scale have been used, from the simple qualitative rating as Very Good, Good, Average, etc., and the rank order, to the recently developed graphic rating scale described by Scott and Hayes (142), in Scott Company bulletins (143), in the 1921 report of the National Association of Corporation Training (108), and in Hayes and Paterson (54). Good descriptions of a number of rating scales and their uses are contained in Kelly (67, 70) and Reilly (128). Miner (94) describes a method for rating an individual by placing a check mark at some point along a line to indicate how high in his group the man falls in each quality considered. Other scales have used descriptive adjectives or phrases to specify the several degrees of a given quality and provided that men should be rated by reference to these descriptive terms. The graphic scale combines these two features of checking on a line and having the standards specified by descriptive terms. This method has proved effective and extremely simple as compared, for example, with the Army method. The two methods are compared by Scott (63). No experimental study has been made, however, as to the relative merits of different rating systems save Kitson's (74) comparison of the Pearson method of rating intelligence with the Army method. He concludes that there is little real difference in the efficiency of the two.

Methods used in determining the qualities upon which executives should be rated and the weighting of these qualities are well described by Gowin (53) and similar methods as applied to men in training at an officers' training camp are discussed by Achilles and Achilles (1). Shelton (147) presents the results of a most interesting experiment in what he calls "mutual rating", where each individual in the entire personnel of a large office rated every other individual—subordinates, equals, and superiors—by means of a secret ballot.

Rating methods in general have been subjected to considerable criticism. Norsworthy (109), Cattell (29), Hollingworth (59), Cogan, Conklin, and Hollingworth (33), Rugg (133), and others have studied the validity of estimates of character traits. The judgments have been found to vary widely in reliability depending upon the qualities used, the individuals rated, and the persons submitting the ratings. Gillette (50) has argued against the entire assumption that ratings on unlike qualities can be summated, but this criticism apparently overlooks the fact that the numbers added are not estimates of unlike things but rather estimates of

the effect of unlike qualities upon a single linear variable, namely, the man's competence for a particular occupation. Gillette's criticisms of the choice of qualities and of the arbitrary weighting procedure are more valuable. Thorndike (160, 161) maintains, on the basis of statistical evidence, that a constant error runs through the ratings on separate qualities—a "halo" effect which spreads to all the separate qualities. He suggests, accordingly, that the rating official "should report the evidence, not a rating, and the rating should be given on the evidence, to each quality separately". Hollingworth (59) and others have pointed out some tendencies toward over-rating and under-rating of associates, depending upon the qualities in use. Simpson (149), Kelly (67), Link (83), and others have emphasized many of the limitations and more or less obvious difficulties of rating systems. In part of the literature criticizing rating scales there is evident that all too common tendency to condemn things on the ground that they fall sadly short of perfection, instead of coolly evaluating them in comparison with any reasonable alternative.

Two articles in particular have gone into the logic of rating methods and laid down valuable theoretical principles for the construction and utilization of scales. These are Thorndike's "Fundamental Theorems in Judging Men" (162) and Kelly's "Principles Underlying the Classification of Men" (71). Studies of this sort make vivid the intricacy of the problem and the consequent necessity for careful experimentation and statistical treatment by trained workers. The central problem of both papers is the question of weighting and combining a number of contributing elements in such a manner as to give the most adequate prediction of a man's success in one of several fields of work. The papers deal with considerations applicable not merely to rating scale technique but likewise to tests and other measurable elements in judging men's fitness. Thorndike concludes that in prophesying a man's fitness, we must assign weights to the traits according to "(1) their relation to fitness, (2) their partial constitution by common elements, and (3) any dependencies whereby one gains or loses in influence according to the amounts of the others which are present". The last necessity is especially disconcerting. It arises from the fact that qualities may have vastly different significance depending upon the extent to which some other quality or qualities are present. Thorndike suggests that informal intuitive judgments in the past have derived their strength, as compared

with formal scales, from the fact that they have allowed for the interdependence of traits. He thinks, perhaps too optimistically, that "sufficient insight and investigation should enable us to secure all the advantages of the impressionistic judgment (except its speed and convenience) without any of its defects". To date, however, we are still without evidence that the formal analytical rating method has given either better or worse results than could be obtained under the same circumstances by a single impressionistic judgment.

In view of the refinements of technique that have been developed for the obtaining and using of rating estimates and checking of results, and in view of the careful examinations of logical and psychological assumptions of rating methods, there would seem to be rather questionable support for the contention of the committee of the National Association of Corporation Schools (**107**) that "a person who is not a psychologist and has had no training in its technique may devise and use rating scales as successfully as a highly trained psychologist or even more so". Is rating scale technique, after all, less a concern of psychologists than a great part of the test work that has been called psychological?

Progress Records.—There is little that is of distinctly psychological interest in those devices of vocational selection that attempt to utilize all available information concerning the worker's productive efficiency, attendance record, earnings, etc. The psychological importance lies mainly in the emphasis upon the taking of a "clinical" view of the individual worker—considering him as a complete personality to be studied and evaluated from every angle—and in the stressing of the necessity for individual growth and advancement for the worker. These points of view, as well as detailed ways and means of keeping "living records" of employees with a view among other things to adequate provision for selection from among them, are well discussed by Scott and Hayes (**142**), Kelly (**70**), Link (**83**), Simons (**148**), and many others.

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REPORT

DEFINITIONS AND LIMITATIONS OF PSCHOLGGICAL TERMS, II.

PREPARED BY A COMMITTEE OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

The first report of this committee, containing formulations of definitions (or delimitations) for 28 fundamental terms, was published in the PSYCHOLOGICAL BULLETIN for 1918, vol. 15, 89–95. The committee's work, suspended during the war, was resumed recently. Various causes have delayed the progress somewhat, but the following terms have been agreed upon.

As before, it was thought desirable to include alternative definitions wherever divergent usage appeared to justify them. The individual members of the committee do not personally accept all the definitions here given, but they believe that every definition included represents the usage of certain psychologists of good standing. The report is unanimous.

It is to be understood that while the American Psychological Association accepted the committee's report and authorized its publication, the Association is in no way responsible for the definitions, nor has it officially approved them.

VI

29. **Introspective Psychology:**
    A systematic study of *mental phenomena* from the point of view of *introspection*.

30. **Analytic Psychology:**
    A systematic study of *mental phenomena* in terms of their *elements*; sometimes contrasted with *genetic psychology*.

31. **Genetic Psychology:**
    A systematic study of *mental phenomena* in terms of the origin and development of *mental life* in the *individual*, in the race, or in any part of the animal series.

32. **Structural Psychology:**
    A systematic study of *mental phenomena* from the point of view of their (momentary) constitution.

33. **Functional Psychology:**
   a. Psychology from the *biological* point of view, with emphasis on the significance of *mental life* as a process of adjustment rather than on its composition.
   b. Psychology from the *dynamic* point of view, regarding *mental life* as developing a system of mental operations.

34. **Dynamic Psychology:**
   a. A systematic interpretation of *mental phenomena* from the point of view of cause and effect.
   b. A synonym for *functional psychology*.

35. **Subjective Psychology:**
   a. Psychology restricted to the study of *mental phenomena* introspectively observable.
      COMMENT: A term used to emphasize the exclusion of organic responses.
   b. A synonym for *introspective psychology*.

36. **Objective Psychology:**
   a. Psychology as concerned with *mental phenomena* expressed in the *behavior* of the organism to the exclusion of *introspective* data.
      COMMENT: A synonym for *Behavior Psychology*.
   b. Psychology as contemplating mental facts inferentially from without rather than introspectively from within.

VII

37. **Activity (mental, psychical):**
   a. Any (mental, psychical) process, in the literal sense of a change.
   b. Any such process regarded as originating in a subject.
   c. Volition, will.

38. **Action:**
   a. Movement made by an *individual* with conscious intent.
   b. A synonym for *behavior*.

39. **Act:**
   a. A consummated *action*.[a]
   b. A synonym for *action*.

40. **Conation:**
   a. Activity seeking fulfillment; purposive activity in all its developments, such as volition, desire, aversion, impulse.
   b. The mental state in which kinesthetic components predominate.

41. **Conduct:**

a. The behavior of an individual as interpreted by other individuals in a common social relationship.

COMMENT: The term is primarily ethical.

b. Behavior shaped by foresight.

VIII

42. **Wish:**

a. An affective-conative tendency in respect to an imagined situation with the belief that the realization of the situation would satisfy a present want.

b. Freudian: The *unconscious* urge of all living things to seek satisfaction (usually identified with, or illustrated by, the sex-impulse).

43. **Disposition:**

a. General: Any organized tendency resulting from previous *experience*, individual or ancestral.

b. Emotional: An organized tendency, the expression of which is predominantly an emotion or a sentiment.

COMMENT: Sometimes used as nearly equivalent to *temperament.*

44. **Set:**

Any organized mental condition or bodily structure which grounds a *disposition.*

45. **Anlage:**

The innate complex psychic organization modified by heredity which forms the basis of the individual's experience and development.

46. **Mental Attitude:**

a. A stabilized *set* or *disposition.*

b. (Bewusstseinslage.) An abbreviated but comprehensive *experience*, occurring principally in connection with affective, cognitive, and conative processes and at present incompletely analyzed.

c. (Einstellung.) The specific mental *disposition* towards incoming experience whereby that experience is modified.

d. Any mode of consciousness in which a self[a] relates itself to its environment.

IX

47. **Instinct:**

a. An organized mode of response determined by inherited neural *dispositions* that have been phylogenetically adapted to a specific type of environmental situation.

b. The inherited *dispositions* to coördinated activities which contribute to the accomplishment of a specific but not consciously predetermined end.

48. **Instinctive Behavior:**

Any complex response which is mainly determined (or so far as determined) by the inherited constitution.

49. **Instinctive:**

a. Pertaining to *instinct.*

b. Innate, *i.e.*, not individually acquired.

X

50. **Constellation:**

An organized group of mental phenomena larger than the inferior complexes out of which it is composed and smaller than the superior or total organization of mind.

51. **Mental Test:**

A standardized device for the purpose of measuring mental ability or of studying the results of mental operations in the individual.

Mary W. Calkins,
Knight Dunlap,
H. N. Gardiner,
Christian A. Ruckmick,
Howard C. Warren,
Chairman

A NOTE OF CORRECTION

In my review of Watt's *The Foundations of Music* (PSYCHOL. BULL., 1921, **18**, 497–500) I have stated that "in applying his theory of fusion and interval to musical usage, Watt is forced to emphasize harmonic structure at the expense of simple melody." Through an inexcusable inadvertence I was led to support this view with a quotation which in its proper context was intended by the author to convey a contrary meaning. "Without harmony, which is the 'perpendicular' complement to the 'horizontal' functions of melody, we have a music which hardly deserves the name of art. It is merely primitive play, as it were" (p. 161). This extreme conclusion which appears to deny any system to the musical usage of the non-harmonic scales employed in the Orient is indicative of the influence a theory may exert over the facts it attempts to organize (p. 499). What the author actually states is that harmony has usually been put down as the one and only basis of true music, from which would follow that non-harmonic music "hardly deserves the name of art," but he adds that "an almost contrary thesis may be vigorously maintained."

While I greatly regret the carelessness with which my quotation was selected, and seek now to correct the impression I gave that Watt regards melody as secondary to harmony in musical evolution, I am unable to amend my conclusion that "many things like the pattern of pure melody seem to be neglected because they do not readily fall within the conception dominating the author's mind." It is against his conception of fusion and his derivation of the musical intervals therefrom that my argument was mainly directed and I am still unconvinced that Watt's foundations are adequate to explain melody.

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BOOKS RECEIVED

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NOTES AND NEWS

PROFESSOR MADISON BENTLEY of the University of Illinois and Professor Herbert S. Langfeld of Harvard University will lecture during the summer at the University of California.

MISS FRANCES BOTKIN has been elected Instructor in Psychology at Smith College and Miss S. Myers has been promoted from assistant to instructor.

THE research chair of medical psychology in the University of Queensland, Brisbane, has been filled by the appointment of Dr. J. P. Lowson, university demonstrator in experimental psychology at the University of Cambridge.

THE second meeting of the informal group known as the "Boston Psychologists" was held at Wellesley College on Saturday, March 18. At the afternoon session questions of laboratory policy and the place of mental tests in systematic psychology were discussed. The dinner, at Tower Court, was followed by a toast to Professor Sanford of Clark University in recognition of his return to active service in psychology. The subject for consideration at the evening session was the status of the practising and consulting psychologist. Twenty-five psychologists from many of the New England colleges and universities attended the meetings. The first gathering of the group took place at Harvard University last November. The invitation to hold the next meeting in the autumn at Clark University was accepted.

PROFESSOR C. A. RUCKMICK, of Wellesley College, will have charge of the courses in psychology at the Summer School of the University of Kentucky this year.

AT the last meeting of the Ohio State Teachers' Association, a Department of Special Education was organized, with Dr. J. E. W. Wallin as President.

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THE PSYCHOLOGICAL BULLETIN

1. GENERAL

259. Weigert, F., Ein photochemisches Modell der Retina. *Arch. f. d. ges. Physiol.*, 1921, **190**, 177–197.

Die Photochloride können unter gewissen Umständen die Farbe des sie erregenden Lichtes annehmen (Ritter, Seebeck u. a.). *Weigert* zeigte, dass die Photochloride und gewisse Farbstoffe (Cyanin u. a.) auch empfindlich sind für die Schwingungsrichtung linearpolarisierten, einfarbigen Lichtes. Auf dieser Tatsache konnten neue, erheblich feinere Untersuchungsmethoden über die Farbenanpassung und die Lichtempfindlichkeit der Photochloride und Farbstoffe aufgebaut werden. Die Farbenanpassung ist um so deutlicher, je verdünnter der Farbstoff ist, die Lichtempfindlichkeit nimmt mit der Beleuchtungsdauer ab. Das Licht bewirkt in den Farbstoffsystemen nach Abtrennung von Elektronen eine Umlagerung ultramikroskopischer Komplexe. Die Rückverwandlung in den ursprönglichen Zustand entspricht einer Strukturveränderung, die eintreten würde, wenn eine andere Farbe eingewirkt hätte. Eine Cyaninkollodiumschicht kann so ein Modell der Retina darstellen. In den Stäbchen und Zapfen ist ein entsprechender Farbstoff (Sehpurpur) vorhanden, in den Zapfen in grosser Verdünnung, deshalb hohe Farbenempfindlichkeit, in den Stäbchen in grosser Konzentration. So werden die Farbenuntüchtigkeit der Stäbchen, die Adaptation und die Erscheinungen der Gegenfarben auf physikalische Processe zurückgeführt.

Steinhausen (Frankfurt a/M.)

260. Titchener, E. B., Functional Psychology and the Psychology of Act: II. *Amer. J. of Psychol.*, 1922, **33**, 43–83.

The psychology of act starts with Brentano who distinguishes the psychical by its intentional nature. Meinong and Husserl criticize his definition of act and Münsterberg objects that the specified

acts are not logically coördinate, for Brentano gives priority to the act of ideation. Stumpf, although he would not admit the validity of Münsterberg's criticism, turns it in his doctrine of "psychical functions." The system of Lipps, which affirms the compresence of the subject, meets Münsterberg's requirements in part. Husserl, keeping his discussion at a phenomenological level, finds that Brentano's statement of the priority of ideation involves an equivocation and recasts it so that it is valid. Husserl's influence is shown in Messer's system. The systems of Witasek and Messer, both experimentalists, when compared show many differences. From the common starting-point of intentionalism, all of the authors quoted have taken widely divergent paths. The various systems do not agree on the classification of psychical phenomena. Successive editions of the work of a single author similarly disagree. The systematic changes do not reflect the growing store of facts, but are the results of continued explication of logical concepts. Sensation and attention likewise prove to be stumbling-blocks for intentionalism. The psychology of act takes the obvious, natural, proximate, common-sense view of psychology and psychological problems, and the adoption of this pre-scientific view as scientific puts a premium upon individual differences, upon personal ingenuity of explication. Both the functional and intentional systems attempt to distinguish "conscious" phenomena as a separate class of objects of experience. In both cases the systems are empirical, that is, technological. They represent what may be called an art of mental living as distinguished from a science of mental life.

G. J. Rich (Pittsburgh)

261. Cobb, P. W., On the Significance of an Experimental Difference, with a Probability Table for Large Deviations. *Science,* 1921, **54**, 200–203.

G. J. Rich (Pittsburgh)

262. Titchener, E. B., Mach's "Lecture on Psychophysics." *Amer. J. of Psychol.,* 1922, **33**, 213–222.

This paper consists of a summary of the lectures on psychophysics given by Ernst Mach at Vienna in 1863. The lectures are practically unknown and difficult of access. In them, Mach first discusses the nature of an "exact" science and the place of psychology and psychophysics as science. He next takes up Herbart's contributions to psychology. The psychophysical methods

are then described, together with the facts of psychophysics (Weber's Law, the Law of the Limen, and Fechner's Parallel Law), and Fechner's interpretations of them. Mach next considers the differences between sight and hearing with respect to analysability, periodicity and conformity to Weber's Law, and the theories which attempt to explain these differences. The lectures close with discussions of the problem of perception and the relation of mind and body, and a postcript on the relation between Herbart and Wundt. These lectures try to teach that physics, physiology and psychology are inevitably bound up with one another, and that we are not bound to despair of exact investigation when we pass beyond the borders of the palpable.

G. J. Rich (Pittsburgh)

263. Titchener, E. B., and Feldman, S., A Bibliography of the Scientific Writings of Wilhelm Wundt (Seventh Supplementary List). *Amer. J. of Psychol.*, 1922, **33**, 260–262.

G. J. Rich (Pittsburgh)

264. Hoisington, L. B., A Table for the Graphic Check of the Method of Constant Stimuli. *Amer. J. of Psychol.*, 1922, **33**, 244–246.

A graphic representation of the actual and of the theoretical values of p in connection with the Method of Constant Stimuli may serve as a rough check on the computations, and is in addition a valuable pedagogical aid. The table here presented is designed to reduce the mere mechanics of the work to the lowest possible limit consistent with the accuracy demanded. It gives the value of p for every value of .01 to 1.60 by steps of .01, from 1.60 to 2.00 by steps of .02, and from 2.00 to 2.80 by steps of .05.

G. J. Rich (Pittsburgh)

265. Boring, E. G., Urban's Tables Again. *Amer. J. of Psychol.*, 1922, **33**, 303–304.

An additional correction to Urban's tables is noted, together with the resulting correction to Rich's checking tables. (The note of correction contains a typographical error. The value for $p = .73$ and $x = -2$ should be 2.2363.)

G. J. Rich (Pittsburgh)

266. Moxon, C., The Influence of Creative Desire upon the Argument for Immortality. *Amer. J. of Psychol.*, 1922, **33**, 255–259.

Maeterlinck has recently argued that man's unconscious soul survives his conscious and bodily death. His first premise is the extent of man's wasted unconscious life. His aesthetic conscience refuses to contemplate the final loss of so great a hidden treasure. His second premise is that "It is admitted that nature does nothing that is useless." Maeterlinck fails to prove this latter statement, or to realize the value of a subconscious, all of which is potentially useful even though only a small part may ever be actually used. The use of so weak an argument by so strong a mind can be understood as a rationalization of the unconscious will to live.

G. J. Rich (Pittsburgh)

267. Cattell, J. McK., The Psychological Corporation. *Science*, 1922, **55**, 169–171.

A statement of the organization and purposes of the Psychological Corporation.

G. J. Rich (Pittsburgh)

268. Ream, M. J., A Statistical Method for Incomplete Order of Merit Rating. *J. of Applied Psychol.*, 1922, **5**, 261–266.

A method has been devised for combining incomplete order of merit ratings in which the judges rate unequal numbers of individuals. For each ran-position on a list containing a given number of names, numerical values are assigned in terms of the standard deviation, assuming a normal distribution in each list of men rated. An individual ranked at the bottom of a list of three names should be assigned a different value from the individual who ranked at the bottom of a list of twelve. On the basis of these assigned values an algebraic average is found for each individual, and from these averages a new ranking is made with the individual with the highest average in position "one," and the individual with the lowest average in position "N." The verification and correction for this new order of merit is accomplished by the method of simple next neighbor comparisons only.

This method was used in the case of the Grant Company. The results of the rating differentiated quite strikingly the exceptionally good from the notoriously inefficient store manager.

E. Mulhall Achilles (Columbia)

269. HUTH, A., Zur Kritik der psychologischen Korrelationsmethoden. *Beiheft 29, Ziet. f. angew. Psychol.,* 1921, 150–157.

Korrelation ist die gegenseitige Beziehung zweier Reihen. Der Korrelationskoeffizient ist ein Mass für die Übereinstimmung resp. Diskrepanz der beiden gegebenen Reihen. Die Korrelation darf nicht mit einem "wahrscheinlichen Fehler" behaftet sein. Der Koeffizient ist der Richtungsfaktor der Geraden, die bei graphischer Darstellung die Grensfälle +1 und —1 darstellen. Die Korrelation stellt dann das arithmetische Mittel aus den Teilkorrelationen der Reihe dar, die ihrerseits eine einfache Funktion des Winkels sind, den die Geraden bei jeder Teilkorrelation bilden. Es hat sich ergeben, dass die bisherigen Methoden zu hohe Korrelationen ergaben.

H. BOGEN (Berlin)

270. SCHULTE, R. W., Neukonstruktionen von Apparaten zur Praktischen Psychologie. *Beiheft 29, Zeit. f. angew. Psychol.,* 1921, 107–130. GOTTSCHALK, E., Neue Prüfgeräte für die industrielle Psychotechnik. *Psychol. Mitteilungen,* 1921, **2**, 174–179.

Bereits im Gebrauch befindliche Apparate anderer Autoren sind einer gründlichen Durchprüfung unterzogen worden und durch annähernd vollständige Ausschaltung möglicher Versuchsfehler und Eichung an vielen Personen für die Praxis neu konstruiert worden, z. B. Augenmassprüfer für Streckenteilung, Kreisteilung und Kreismittelpunktsfindung; Grundrichtungs-, Sehschärfen-, Feindruck-, Schlagkraft-, Zug- und Druckkraftprüfer, Zitterschreiber, Reaktionsprüfer und ein Apparatesatz zur Feststellung der technischen Findigkeit.

H. BOGEN (Berlin)

271. KAFKA, G., Zwei neue Apparate zur Eignungsprüfung für Strassenbahner. (Vorläufige Mitteilung.) *Beiheft 29, Zeit. f. angew. Psychol.,* 1921, 95–101.

Die erste Versuchsanordnung gibt die Situation einer drohenden Zusammenstossgefahr, die sie in vier Richtungen symbolisiert. Die Versuchsperson hat rechtzeitig die Stromzufuhr zu vermindern oder zu unterbrechen. Bewertung geschieht nach der gebrauchten Zeit und nach der Zahl der "Zusammenstösse."—Die zweite Anordnung lässt gegen und über ein Geleise, auf dem ein Wagen läuft, einen

Passanten mit verschiedener Geschwindigkeit und in verschiedener Höhe des Geleises sich bewegen. Anzahl und Zeitpunkt der Warnsignale und der des " Überfahrens " werden elektromagnetisch registriert.

H. Bogen (Berlin)

272. Lipmann, O., Allgemeine und kritische Bemerkungen zur Begabungs- und Eignungsforschung. *Beiheft 29, Zeit. f. angew. Psychol.,* 1921, 17–31.

Es wird die Grenze festgelegt, die zwischen der practischen Psychologie als Gewerbe und der angewandten Psychologie als Wissenschaft besteht. Für die letztere ist die übliche Art der wissenschaftlichen Darlegung ihrer Methoden in voller Ausfürlichkeit Pflicht. Die Korrelationsrechnung gewinnt hier neue Bedeutung, indem scharf zwischen ihrer praktischen und wissenschaftlichen Anwendung unterschieden werden muss. Die Bewährungsstatistik für Eignungsprüfungen hat auf die Gewinnung von Funktionsprobearbiten im Betrieb hinzuarbeiten. Ferner ist die Frage der Dispositionsschwankungen in ihrer Bedeutung für die Testpsychologie mehr als bisher zu bearbeiten, um aus einer Theorie derselben Richtlinien für die Praxis zu gewinnen. Der qualitativen Beobachtung ist der ihr gebührende Platz gegenüber dem Experiment einzuräumen.

H. Bogen (Berlin)

273. Stern, W., Richtlinien für die Methodik der psychologischen Prax is. *Beiheft 29, Zeit. f. angew. Psychol.,* 1921, 1–16.

Die rasche Entwicklung der praktischen Psychologie, die durch Aufträge veilfach schnelle Terminarbeit zu leisten hat, zwingt zu methodischer Selbstbesinnung. Die Institute müssen besondere Assistenten für die Weiterführung der Forschung erhalten. Bei Ausleseprüfungen ist das zahlenmässige Ergebnis der Prüfung durch Beobachtungsergebnisse zu korrigieren. Der Einzelprüfung ist der Vorzug zu geben. Abstraktes Prüfverfahren und Schema der Wirklichkeit haben sich zu ergänzen. Der Übungsfähigkeit und der Ausbildung von Surrogatfunktionen ist besondere Aufmerksomkeit zuzuwenden. Die Bewertung der Prüfergebnisse ist nur Sache des Psychologen. Vor allem bedürfen die Bewährungsproben weiterer Ausbauarbeit.

H. Bogen (Berlin)

274. Giese, F., Die Automatisierung psychologischer Laboratorien. *Psychol. Mitteilungen,* 1920, **1**, 117–120.

Befühwortet eine Vollautomatisierung der psychologischen Prüfeinrichtungen, um dem Psychologen durch Abnohme aller äusserlichen Arbeit Raum zu schaffen für psychologische Beobachtung der Arbeitweise der Prüflings. An Beispielen aus eigener Praxis wird das Wesen und der Umfang der Automatisierung klargelegt.

H. Bogen (Berlin)

2. NERVOUS SYSTEM

275. Pfeifer, R. A., Die Lokalisation der Tonskala innerhalb der kortikalen Hörsphäre des Menschen. *Monat. f. Psychiat. u. Neurol.,* 1921, **50**, 7–48; 99–108.

Nach P. sprechen entscheidende Argumente zu Gunsten einer distinkten Lokalisation der Tonreihe in der menschlichen Hörsphäre (Rinde der temporalen Querwindung) und zwar der hohen Töne in der Tiefe der Fossa Sylvii und der tiefen Töne kontinuierlich nach der äusseren Kovexität der obersten Temporalwindung zu. Die stark variierende Konfiguration der temporalen Querwindung bei den Menschen macht es wahrscheinlich, dass die Hirnsphäre nicht lediglich "die enge Eintrittspforte der akustischen Reize in die Grosshirnrinde darstellt, sondern bereits die Bedeutung eines psychischen Zentrums besitzt"; die Variation erscheint daher als der morphologische Ausdruck für die individuell verschiedene Beanlagung auf akustischem Gebiet, insbesondere für Musik. Unversehrtheit der Hörstrahlung bzw. Härsphäre links scheint Voraussetzung für die Unversehrtheit des Musiksinnes zu sein. Totale Unterbrechung der linken Hörstrahlung bzw. Zerstörung der linken Hörschäre hat Amusie zur Folge und zwar trotz Erhaltenseins der Perzeptionsfähigkeit der kontinuierlichen Tonreihe mittels der andern Hemisphäre. Besonders interessant ist die kritische Besprechung der in der Literatur mitgeiteilten Fälle. Die Beobachtungen von Kalischer hält Verf.—wie auch Ref. schon vor langer Zeit erklärt hat—nicht für beweiskräftig.

Th. Ziehen (Halle)

276. Hilpert, P., Anatomie und Beduetung das Fornix longus beim Menschen. *Monats. f. Psychiat. u. Neurol.,* 1921, **49**, 13–41.

Mit Hilfe exakter Untersuchungen nach der Flechsigschen Methode weist Verf. nach, dass das System des Fornix longus ein

Projektionssystem zwischen Lamina perforata anterior und Hippocampus ist, das wahrscheinlich die meisten Riecheindrücke dem Riechzentrum zuleitet. Der Fornix longus bildet zusammen mit dem Fornix inferior ein "konjugiertes Strangpaar" der Reichsphäre. Die erstere führt die Erregungen zu, der letztere setzt sie in Bewegungen wie Abwehr oder Anziehung, z.B. auf sexuellem Gebiet, um. Die Lamina perforata ant. würde nach Verf. das Internodium einer Sinnesleitung für den Geruch darstellen.

TH. ZIEHEN (Halle)

277. LENNARTZ, E. H., Die Reaktion der Capillaren auf mechanische Reize bei Nichtschwangeren, Schwangeren und Wöchnerinnen. *Arch. f. d. ges. Physiol.*, 1921, **191**, 302–311.

Nach mechanischen Reizen (Streichen mit Fingernagel oder Nadelspitze sanft oder kräftig, Reiben, Drücken, etc.) erscheinen am Arm neue Capillaren, am Nagelfalz nicht. Etwa vorhandene Stasen (besonders bei Schwangeren, bei Wöchnerinnen vereinzelt in den ersten Tagen post partum) verschwinden für kürzere oder längere Zeit, die Strömung wird beschleunigt und kontinuierlich, das Capillarlumen weiter. Die Reizwirkung daubert 3–4 Minuten; nach 7–8 Minuten ist sie abgeklungen. Stärkere Reize bewirken eventuell längere Wirkungsdauer. "Der Grund für die selbständige Erweiterung der Capillaren bleibt zu suchen."

HAPPEL (Frankfurt a/M)

278. PARRISIUS, W., Zur Frage der Contractilität der menschlichen Hautecapillaren. *Arch. f. d. ges. Physiol.*, 1921, **191**, 217–233.

Die Literaturübersicht zeigt, dass man für den Menschen gezüglich der Capillarcontractionen und-dilitationen bis vor kurzem auf Vermutungen angewiesen war. So sah Rouget im plötzlichen Erblassen nach psychischer Emotion absolute Beweiskraft für die Capillarcontractilität. P. konnte mit der Müller-Weihsschen Methode durch direkte Beobachtungen am Menschen peristaltische Vorgänge, spastische Einschnürungen und atonische Erweiterungen an krankhaft veränderten Capillaren wahrnehmen. Ob diese Wahrnehmungen etwas physiologisches sind, "das sich unter pathologischen Bedingungen nur bis zur grobsinnlichen Wahrnehmung steigert," müssen weitere Studien entscheiden.

HAPPEL (Frankfurt a/M)

3. SENSATION AND PERCEPTION

279. JAENSCH, E. R., und REICH, F., Ueber die Lokalisation im Sehraum. *Zeits. f. Psychol.*, 1921, **86**, 278–367.

Nach einer Darstellung der Lokalisation der Anschauungsbilder bei ruhigem Blick sowie bei Augenwanderungen untersuchen die beiden Autoren die Kernfläche des Sehraums nach eidetischem Verfahren, d.h. unter Zugrundelegung der Erscheinungen, die sich bei Versuchen über Horopterabweichung im subjektiven optischen Anschauungsbild zeigen lassen. Sowohl im gewöhnlichen Sehen wie bei Versuchen am Anschauungsbild beobachteten die Verfasser bei Untersuchungen der Hering-Hillebrandschen Horopterabweichung, die sie mit Hilfe dreier vertikaler Fäden bezw. mit dem Anschauungsbilde derselben vornahmen, drei typische Verhaltungsweisen ihrer Versuchspersonen, der en erste sich mit der von Hering und Hillebrand als regulär beschriebenen deckte. Die eingehende experimentelle Analyse der Erscheinung, wie sie sich im Anschauungsbildm in besonders hohem Grade und in starker Beeinflussbarkeit darbot, führte zur Bestätigung des schon früher (Ueber die Wahrnehmung des Raumes, 1911) von Jaensch formulierten Resultates, dass die Ursache der Erscheinung in Impulsen (Nahe- und Fernimpulsen) der Aufmerksamkeit, in Besonderheiten der Auffassung (ob kollektiv oder singular) sowie in Aufmerksamkeitswanderungen zu suchen sei. Durch Versuche bei hemieidetischer Verhaltungsweise, d.h. bei längerer direkter Beobachtung der Fäden durch eidetische Beobachter, liessen sich experimentell Uebergangsformen zwischen den bei gewöhnlichen und eidetischem Sehen zu beobachtenden Erscheinungeherstellen, die bewiesen, dass eine Uebertragung der Ergebnisse jener Analyse auf den Fall des gewöhnlichen Sehens statthaft ist.

O. KROH (Göttingen)

280. KRÖNCKE, K., Zur Phänomenologie der Kernfläche des Sehraums. *Zeits. f. Sinnesphysiol.*, 1921, **52**, 217–228.

Kröncke untersucht die Kernfläche des Sehraums auf der Höhe der ontogenetischen Entwicklung, d.h. an normalen, nichteidetischen Erwachsenen. Ein Gitter von 4–7 Fäden wird 1. bei langsamer, 2. bei schneller Blickdurchwanderung und 3. bei stationärer Fixation beobachtet. Im ersten Falle erscheinen die Fäden in einer Zickzackkurve angeordnet, im zweiten Falle kann ausserdem auch ein dauernder schwingender Bewegungszustand der Fäden beobachtet werden. Im dritten Falle wird entweder ein einzelner Faden

fixiert oder es werden mehrere Fäden kollektiv aufgefasst; dabei lassen sich die von Jaensch und Reich beobachteten typischen Verhaltungsweisen feststellen. Die Erklärung ergibt sich auch hier mit Hilfe von Jaenschs Aufmerksamkeitshypothese.

O. Kroh (Göttingen)

281. Jaensch, E. R., Ueber den Nativismus in der Lehre von der Raumwahrnehmung (Beilage zu der Arbeit von K. Kröncke). *Zeit. f. Sinnesphysiol.*, 1921, **52**, 229–234.

In enger Anlehnung an die experimentellen Befunde der vorhergehenden Arbeit zeigt Jaensch hier zunächst, wie wenig der reine Empirismus imstande ist, die beobachteten Erscheinungen befriedigend zu erklären. Auch der Nativismus in seiner älteren, auf der Annahme bestimmter anatomischer Substrate basievenden Formulierung erweist sich als unzulänglicher Erklärungsversuch. An seine Stelle tritt der jüngere Nativismus, der Sisteme von angeborenen psychophysiologischen Funktionen aufzeigt, "die der Erfahrung als notwendige Vorbedingungen zugrunde liegen" und "biegsam, wandelbar, äusserst anpassungsfähig an die Umweltbedingungen" sind.

O. Kroh (Göttingen)

282. Ebbecke, U., Die lokale galvanische Reaktion der Haut. (Ueber die Beziehung zwischen lokaler Reizung und elektrischer Leitfähigkeit.) *Arch. f. d. ges. Physiol.*, 1921, **190**, 230–269.

Bei der lokalen vasomotorischen der Haut (nach direkter Hautreizung) findet sich wie bei der psychogalvanischen Reaktion eine starke Abnahme des Gleichstromwiderstandes, während der Wechselstromwiderstand (Messung nach der Substitutionsmethode mit Hochfrequenz und Duddelgalvanometer) sehr klein und unbeeinflusst durch die lokale Reaktion der Haut gefunden wurde. *Ebbecke* deutet diesen Befund im Sinn einer Zellerregung der Hautepithelien, wobei die Membranpermeabilität wächst und damit die Polarisationsfähigkeit abnimmt.

Steinhausen (Frankfurt a/M)

283. Einthoven, W., Über die Beobachtung und Abbildung dünner Fäden. *Arch. f. d. ges. Physiol.*, 1921, **191**, 60–98.

Während zwei Lichtlinien noch getrennt gehesen werden, wenn sie auf der Netzhaut unter einem Winkel von 60 Sek. abgebildet werden, wird ein dunkler Faden gegen einen hellen Hintergrund

noch bei einem Gesichtswinkel von 2 Sek. gesehen. Bei dem Sehen des Fadens kommen nämlich nicht die Abmessungen der Netzhautzapfen, sondern das Unterscheidungsvermögen für zwei Helligkeiten in betracht. Die physikalischen Gesettmässigkeiten werden hierfür abgeleitet und die Bedingungen für die Abbildung von solchen Fäden durch des Mikroskop untersucht mit besonderer Berücksichtigung der Abbildung im Saitengalvanometer. Der Durchoesser des dünnsten im Mikroskop theoretisch noch sichtbaren Fadens wird zu $0{,}2.10^{-6}$ $\mu\mu$ berechnet. Ausserdem werden die Methoden besprochen, nach denen man den Durchmesser dünnster Fäden bestimmen kann.

STEINHAUSEN (Frankfurt a/M)

284. SCHANZ, F., Die physikalischen Vorgänge bei der optischen Sensibilisation. *Arch. f. d. ges. Physiol.*, 1921, **190**, 311–320.

Schanz stellt Messungen an über den lichtelektrischen Effekt verschiedener Substanzen (Farbstoffe, Eiweissstoffe u.a.). Aus seinen Messungen schliesst er auf einen Zusammenhang zwischen Fluorescenz und lictelektrischer Zerstreuung und kommt dadurch zu einer Theorie der Wirkung optischer Sensibilisatoren, nach der die durch lichtelektrische Zerstreuung freigewordenen Elektronen auf die Eiweissstoffe wirken.

STEINHAUSEN (Frankfurt a/M)

285. COBBEY, L. W., and SULLIVAN, A. H., An Experimental Study of the Perception of Oiliness. *Amer. J. of Psychol.*, 1922, **33**, 121–127.

The first part of the experiment consisted of an analysis of the perception of oiliness. In the first experiment the observer's finger was immersed in various oils. The perception was always analyzed into a blend of warmth and pressure. In the second experiment, the finger was immersed in water at 32° which was gradually heated. At 38° or 40°, the perception of oiliness was reported and again analyzed into a rather intimate blend of warmth and pressure. The next part of the work was an attempt to synthetize the oily experience by stimulating adjoining warm spots and pressure spots with a heated camel's hair brush, which was successful approximately one-half of the time. In the final experiment, the perception was produced by bending a hair with a heated cylinder, which did not touch the skin. Omitting one untrained observer, this method succeeded in 74% of the trials.

G. J. RICH (Pittsburgh)

286. LUFKIN, H. M., Cutaneous Localization and the "Attribute of Order." *Amer. J. of Psychol.*, 1922, **33**, 128–134.

This experiment was devised to test Watt's statement that on the skin every touch-spot can be distinguished from every other one if separated sufficiently for isolated stimulation. An area upon the back, a part of the body relatively free from emperistic motives, was found in which the sensory response of the pressure-spots was as nearly as possible attributively the same. In the first series, two pressure spots with at least one pressure spot between them were stimulated successively. Judgments of "same" were obtained, in varying percentages according to separation, with separations up to 35 mm. In the separate series a single spot was stimulated twice in succession. The "same" judgments averaged about one-half of the total in this series. These results suggest that localization is a matter of perception rather than sensation.

G. J. RICH (Pittsburgh)

287. SHULTS, E., On the Non-Visual Perception of the Length of Vertically Whipped Rods. *Amer. J. of Psychol.*, 1922, **33**, 135–139.

288. BAKER, A. S., On the Non-Visual Perception of the Length of Horizontally Whipped Rods. *Amer. J. of Psychol.*, 1922, **33**, 139–144.

These studies supplement the work of Hoisington on the perception of the length of lifted rods, taking up the analysis of the perception at a more complex level. Four series were worked through. In the first series all three moments of length, weight and center of mass varied, while in each of the remaining series but one of these moments varied. Separate qualitative and quantitative series were undertaken, five comparison stimuli being used. The perception of the length of vertically whipped rods depended primarily upon the relative intensity of two opposed pressure experiences in the hand and secondarily upon differences in the frequency and rate of intensive changes with the whip. In the case of horizontally whipped rods, the perception of length likewise depended primarily upon the opposed pressure. The secondary factors in this case were pressures and strains in the arm and hand, shift of pressure in the hand, and differences in temporal formation, in extent and in intensity. The perception of the length of horizontally whipped rods proved to be more accurate than that of vertically whipped rods.

G. J. RICH (Pittsburgh)

289. WEAD, C. K., Acoustical Notes. *Science,* 1921, **54**, 467–469.

(1) Pianos in which one string of each unison of three has been tuned to give a slow beat with the other two have proved popular. This is not because one string is out of tune in the ordinary sense of the word, but because of the tremolo effect produced, which gives a new variety to the piano tone. (2) The tuning fork must not be considered as two bars each attached at one end to a solid block. It is a vibrating bar in which the nodes are close together. The intermediate part, between the nodes, rises and falls a minute distance as the prongs vibrate, and delivers regular blows to the sounding board or resonance box.

G. J. RICH (Pittsburgh)

290. YOUNG, P. T., The Vibrations of a Tuning Fork. *Science,* 1921, **54**, 604–605.

Both Rayleigh and Barton, his pupil, regard each prong of a tuning fork as a straight bar fixed at the end near the stem and free at the other end.

G. J. RICH (Pittsburgh)

291. HALVERSON, H. M., Binaural Localization of Tones as Dependent upon Differences of Phase and Intensity. *Amer. J. of Psychol.,* 1922, **33**, 178–212.

In the first experiment, a tone from a single source was led to the ears by closed tubes, one of which could be varied in length. The results showed that under these conditions localization may be a function of the phase-relation of the tones at the two ears. In the second part of the study two similar tones were produced by telephone receivers placed at varying positions on either side of the observer's head, no conducting tubes being used. Again, localization appeared as a function of the phase relation. In these series, the first and second partials of the tonal complex were simultaneously localized, and each followed the law of phase-difference independently of the other. The final experiments were also performed with two telephone receivers and no conducting tubes, but the intensities of the tones were varied instead of their phase-relations. With intensive variation the localization moved slightly, but usually remained in the region of the median plane of the head, except that with extreme intensive variation localization appeared at either side of the head near the aural axis, although it did not move there continuously. The shift of localization due to intensive change was thus discontinuous and not regular as it was for difference of phase.

Difference of phase thus seemed to be a more effective factor in determining localization than was the binaural ratio. All observers localized the tones in visual terms by placing a visual image that stands for the tone within a visual scheme that represents the field of space.

G. J. Rich (Pittsburgh)

292. Ogden, R. M., Are There Any Sensations? *Amer. J. of Psychol.*, 1922, **33**, 247–254.

The older introspectionists attempted to analyze consciousness into unitary phenomena, such as sensations, images, and feelings. A complete analysis was never possible because the absolute simplicity of a single mental entity, to be taken up and examined apart from every other entity of mind, always eluded one's grasp. Only the attributes were observed. The modern phenomenology of perception has shown that perceptual patterns are integrated units, which upon analysis are reduced to a number of attributive aspects rather than to a number of conscious particles. Any attempt to distinguish logically between the types of integration called sensations and those called perceptions leads to difficulties. The ease with which many psychologists have accepted the principles of behaviorism seems to indicate an inherent difficulty in the conception of sensation by the readiness with which the stimulus is accepted in its place. Yet the behaviorist has failed to control the mediation between stimulus and response. The newer neurological views of Head point to the fact that integration occurs as impulses pass from the periphery toward the higher centers, a further challenge to the validity of the concept of sensation. If we take the perceptual pattern as our basis of analysis and study its attributive aspects under controlled conditions, we shall be dealing with the only elements of mind that are capable of treatment in isolation from one another and at the same time in intimate dependence upon physical conditions that can be exactly measured.

G. J. Rich (Pittsburgh)

293. Amen, E. W., An Experimental Investigation of the Experience Which Accompanies the Sudden Cessation of an Auditory Stimulus. *Amer. J. of Psychol.*, 1922, **33**, 263–267.

This paper reports an experimental study of the "modified ending" found in experiments upon the positive after-image in audition.

Using the same apparatus as in the previous work by Bishop, but directing the attention of the observers toward any change in the tone which occurred as it was going off, the "modified ending" was always found. It is qualitatively different from the stimulus-tone, and is probably a change from tonal to noisy characteristics. Uniformity of description was not attained.

G. J. Rich (Pittsburgh)

294. Thalman, W. A., The After-Effect of Movement in the Sense of Touch. *Amer. J. of Psychol.*, 1922, **33**, 268–276.

Negative after-images of movement were obtained following the movement of a string or a linen band along the under surface of the arm. Compulsory conditions for the after-effect were obtained when the forearm was stimulated by a rough and coarsely corrugated linen band. The conditions were even more compelling when the stimulus was not removed, that is, when pressure stimulation continued after the objective movement ceased. Similar results were obtained upon the calf of the leg. The mental processes involved were at times cutaneous, at times subcutaneous, and at other times a combination of the two. The after-effect was an integration of intensity, time, and cutaneous extent.

G. J. Rich (Pittsburgh)

295. Andrews, W. A., Haptical Illusions of Movement. *Amer. J. of Psychol.*, 1922, **33**, 277–284.

The object of this investigation was to find the optimal conditions for, and obtain a psychological description of, the "bow" illusion of movement upon the skin reported by Benussi. In the preliminary experiments, two points were applied to the skin successively. This stimulus was not adequate to the perception of movement, which seemed to depend on subjective as well as objective conditions. In the main experiments, the desired attitude was produced by rapidly repeating the bimembral stimulus, and various kinds and types of movement were reported. The diversities in the results of the different observers indicated that the essential requirement for the perception was that the observers should have the idea of movement. The perception is gradually built up. The arc, loop, or bow movement is a meaning carried by associated visual or kinaesthetic images.

G. J. Rich (Pittsburgh)

296. WHITCHURCH, A. K., Synaesthesia in a Child of Three and a Half Years. *Amer. J. of Psychol.*, 1922, **33**, 302–303.

A case of colored hearing is reported. The colors of various noises and of musical tones are noted.

G. J. RICH (Pittsburgh)

5. MOTOR PHENOMENA AND ACTION

297. POPPER, E., Studien über Saugphänomene. *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, **63**, 231–246.

Verf. hat die Saugphänomene bei über 70 menschlichen Neugeborenen untersucht (Alter ½ Stunde bis 10 Tage). Interessant ist die übrigens sehr variable Abhängigkeit vom Hungerzustand und die Auslösbarkeit von "Schnappreflexen" durch streichelndes Berühren der seitlichen Wangenpartien. Die mannigfachen Teilphänomene des Saugens werden nach Verf. konstant von einem initialen einfachen Reflex, der sich als eine Art Mundspitzen ("Rüssel" bildung behufs Umfassung der mütterlichen Brustwarze) darstellt, eingeleitet. Ob die Saugphänomene lediglich reflektorisch sind oder auch "freie Willkürakte" hinzukommen, bleibt dahingestellt. Verf. neigt zur Annahme, dass zwar am funktionellen Ausgangspunkt solcher infantiler Mechanismen einfache, einleitende Reflexe stehen, dass diese aber doch nur "eine Art Wecker und Wächter" für die infantilen Instinkthandlungen sind, d.h. nur Amreiz geben, Einleitung und Form der kindlichen Urleistungen beherrschen und so den Primitivtrieben den Weg ihrer motorischen Entäusserung weisen sollen.

TH. ZIEHEN (Halle)

298. KORNILOFF, K., Dynamometrische Methode der Untersuchung der Reaktionen. *Arch f. d. ges. Psychol.*, 1921, **42**, 59–78.

Die Veröffentlichung dieser im Moskauer psychologischen Institut angestellten Untersuchung aus dem Jahre 1914 ist durch den Krieg verzögert worden. Sie zeigt sich durch ähnliche Problemstellungen des Kraepelin'schen Laboratoriums von Specht und Isserlin beeinflubt. An 4 Versuchspersonen wurden die Beziehungen zwischen der chronoskopisch gemessenen Reaktionszeit und der durch einen Dynamographen (Quecksilbermanometer mit Schreiber) aufgezeichneten Energie und Verlaufsform der Bewegung verfolgt., u.z. bei vier Einstellungen:1) möglichst ungezwungen natürlich, 2. muskulär, 3. sensoriell, 4. Unterscheidungs-

reaktion. Bei 1) traten zwei Typen (aktiv and passiv) hervor, ohne eindeutige generelle Beziehungen zwischen der R.—Zeit und der Kraft und Form der Bewegung. Bei 2) nahm dagegen die Verkürzung mit der Verkürzung der Reaktionszeit zu, bei 3) und 4) ging der Verlängerung eine Abnahme der Kraft und Geschwindigkeit parallel.

W. Wirth (Leipzig)

299. Einthoven, W., und Roos, J., Ueber Widerstand und Potentialdifferenz bei dem psychogalvanischen Reflex. *Arch. f. d. ges. Physiol.*, 1921, **189**, 126–136.

Einthoven und Roos geben eine Schaltung an, bei der sie beim psychogalvanischen Reflex die Aenderungen der Potentialdifferenz einerseits und des Widerstandes und der Polarisation andrerseits getrennt glauben messen zu können. Als Messinstrument benutzen sie das Saitengalvanometer. Sie finden bei verschiedenen Personen ein verschiedenes Verhalten in bezug auf das Verhältnis der Aenderung der Potentialdifferenz zur Widerstandsänderung. Sie glauben, dass beim psychogalvanischen Reflex die Aenderung der Potentialdifferenz in anderen Körperregionen stattfindet, als die Aenderung des Widerstandes und der Polarisation, wobei die beiden letzteren nach E. und R. sich immer im gleichen Sinne ändern. Betreffs Begründung ihrer Anschauungen und genauerer Analyse wird auf eine demnächst erscheinende Arbeit verwiesen, die abgewartet werden muss.

Steinhausen (Frankfurt a/M)

300. Link, H. C., Instincts and Value. *Amer. J. of Psychol.*, 1922, **33**, 1–18.

A widespread but exceedingly loose use of the term instinct has succeeded the older intellectual rationalism and ultimately resulted in a new kind of rationalism, the rationalism of instinct. The mechanist and behaviorist define instinct in such a way as to eliminate the concept of value, while those who define instinct in terms of emotion and intelligence make it so easy to attribute all values to instinct that the procedure loses scientific validity. Where instincts are considered fixed and fundamental forces, values cannot arise; whereas where instincts are considered merely elements in an organism which expresses values more comprehensive than the separate instincts themselves, the question arises: What relations exist between the values which represent the organism as a whole and the

instincts which go to make up the whole? An organism resembles a compound and has qualities not contained in any of the instincts, reflexes, or physicochemical configurations into which it may be divided. The chief characteristic of the organism as a unit is the valuing process. This valuing process, through which an organism is continually expressing itself, is a dynamic factor in the causal series, actually entering into the determination of the instincts of an organism under certain conditions. Philosophy has struggled long and hard without becoming conscious of the full significance of the valuing process, though continually using it. The meaning of value does not lie in instinct. It is an unanalyzable factor.

G. J. Rich (Pittsburgh)

301. Kantor, J. R., The Psychology of Reflex Action. *Amer. J. of Psychol.*, 1922, **33**, 19–42.

Reflex action is to be considered one type of a response to a stimulus, that is to say, a definite adaptation act, and as such is of interest to the psychologist. The reflex act is an organismic response, a response whose arousal is traceable to some effect produced upon the person by some external object or some need for adaptation existing within the organism itself. It is an inseparable part of the total behavior of the organism. Reflex action is marked off from other types of behavior in that it is a simple and immediate response to a directly presented stimulus, that there is only one reaction system in it, and that it includes no precurrent or anticipatory reactions. As a consequence it possesses the specific characteristics of relative automaticity, constancy, permanency, and localizability. A reflex reaction system is a typical unit of psychological activity, and therefore includes cognitive, affective, and conative factors. Since reflex action is a segment of the total behavior of an organism, the hypothesis which makes it a neural pathway is merely a convenient fiction. Animal reflexes differ from human reflexes only in so far as the total behavior equipment of the animal is less developed. Just for this reason, experiments involving transection or extirpation of parts of the nervous system are possible to a greater degree in animals than in human beings. Reflex actions are stimulated by objects of various sorts, and by circumstances and situations, and may themselves act as stimuli to further behavior. As instincts are behavior segments of a different order and setting, they are not to be considered as mere chains of reflexes.

G. J. Rich (Pittsburgh)

302. HUNTER, W. S., The Modification of Instinct. *J. of Philos.*, 1922, **19**, 98–101.

The writer took the position in an article in *Psychol. Rev.*, 1920, **27**, that instinct could be modified by habits previously formed before the appearance of the instinct. This has been questioned by Leuba and Kuo. The basis or partial basis for the writer's statement was an observation made by C. O. Whiteman on pigeons, that if the bird of one species is hatched and reared by another of a different species when it is mature it will be inclined to want to mate with the species with which it was reared. In this case as well as in human behavior the type of modification is of the nature of a conditioned reflex. The sex instinct is aroused by a stimulus and controlled by synaptic connections and the problem is as to whether previously formed habits have set certain stimuli as the ones for provoking the instinct. At least two classes of stimuli are involved in producing sexual reactions, viz., visceral sensory impulses, or desire on the conscious side, and somatic sensory impulses produced by the stimulus or its symbol. Cutaneous, olfactory and visual stimuli seem to be the more important factors here for somatic media. There is a close relation between the internal secretions and sex responses in the somatic and visceral effectors. But the writer assumes that the motor grouping is accompanied by a nervous organization set for certain somatic stimuli. However, if experiment should show there is no somatic afferent connection set by heredity the situation would be different.

In regard to the question as to the reality of instincts the present state of questioning is a wholesome one. To offset Kuo's denial of the existence of delayed instincts citation is made to the discussions of Lloyd Morgan on the moorhen's first dive and of Yerkes and Boomfield on the behavior of kittens in killing mice. Likewise Yerkes' account of the savageness and wildness in rats is a case in point.

T. R. GARTH (Texas)

303. GEIGER, J. R., Must We Give Up Instincts in Psychology? *J. of Philos.*, 1922, **19**, 94–98.

Taking issue with Zing Yang Kuo of University of California, and with others, the writer believes that such arguments as are offered for giving up instincts in psychology are loose and quite open to attack. There may be disagreement among writers as to instincts but this does not argue for their nonexistence and this confusion will finally disappear as study advances. There may be

a sense in which the relation between the organism and its environment may be called *a priori* but there is nothing, it will be found, that could be regarded as mysterious about it. An innate idea ascribed to transcendental source is entirely a different thing from *a priori* in this sense and because a tendency is inborn it cannot be conveniently discarded on this ground. Mr. Kuo is forced to make use of it in order to account for the development of behavior. "Random" and "spontaneous" actions are socalled on account of their being apparently nonpurposive and yet they serve this purpose: they "are the stuff out of which" activities of later life are organized. The reason they are not classed as instincts is that they are not organized in the sense that "instincts" are relevant to their environment. The primary condition of relevant movement is internal, not external, and the emphasis should fall on the neural structures of the organism instead of environmental stimuli, and this "minimum core" of action in so far as it is inborn deserves the name "Instinct."

T. R. Garth (Texas)

304. Dunlap, K., The Identity of Instinct and Habit. *J. of Philos.*, 1922, **19**, 85–93.

The writer questioned the value of the conception of instincts in a paper two years ago, *i.e.*, many reaction patterns may be called instinctive because unlearned, but being in one reaction pattern does not preclude its being in another. The teleological character of instincts is not a basis for psychological classification but classifications are made for the convenience of the classifier-biologist, philosopher, psychologist, etc. Many writers have since taken up "the cudgel" against instincts. It is possible that instinct, meaning action resulting from the environment and the makeup of the animal, may well be. The action should then be called "instinctive."

Many social psychologists have seemed to regard "instinct" as ready-made entities for their social psychology. The writer has no quarrel with the customary classification of human tendencies into native and acquired and with regarding intelligence as ability to modify reaction tendencies. The mistake is in taking groups of instinctive tendencies as instincts. Criteria are needed then to distinguish reflexes from instincts in consequence. If we take a physiological standpoint, there are no instincts but groups of "reactivities" and some of these at one time will include the other group and *vice versa*. They overlap. However, this overlapping is not the greatest difficulty in classification, but comes of the tend-

ency for one to shade indefinitely off into the other. To distinguish instincts on a basis of emotion accompanying is unwise, but it may be possible to classify on a basis of desire eventually. Stimulus patterns of instincts have been usually regarded as "spatial" and habit patterns as "temporal," but the writer does not regard these two sorts of patterns as essentially different. There is no way of distinguishing effectively and usefully between instinct and habit today—all reactions are instinctive, all are acquired.

T. R. Garth (Texas)

305. Hocking, W. E., The Dilemma in the Conception of the Instinct. *J. of Abnor. Psychol.*, 1921, **16**, 73–96.

In popular and literary use the term instinct implies both a mode of interest and a mode of behavior; but such a hybrid definition is not satisfactory to the scientist. The main interest-trends of life are extremely general, while the behavior mechanisms are just as specific. For this reason Professor Hocking says: "The hard alternative would seem to be that between behavioristic clarity with inadequacy, and introspective adequacy with muddle." He then casts about for a solution of the dilemma, and first examining the physiological explanation of behavior, decides that "We can save the possibility of a physiological explanation of instinct, but at the cost of much of its usefulness." Eventually, he concludes that one must depend on introspection for a satisfactory theory of instincts and that such a theory cannot be completed "until it becomes, in its major part, a corollary of the theory of values." Therefore: "An instinct is any specific form of the will-to-power which reaches its end by the use of innate motor mechanisms, common to the species."

R. S. Hunt (Harvard)

6. ATTENTION, MEMORY AND THOUGHT

306. Lindworski, J., Beiträge zur Lehre von den Vorstellungen. *Arch. f. d. ges. Psychol.*, 1921, **42**, 91–96.

Eine Statistik über die Abstraktheit und Allgemeinheit der Vorstellungen, die bei der Lösung von Aufgaben in Denkexperimenten auftreten, ergab, das die Lösung vor allem mit "begrifflichen" Vorstellungen erfolgte, die sich vom Allgemeinen zum Besondern entwickeln und namenflich in Ruhepausen anschauliche Einzelinhalte hervortreten lassen.

W. Wirth (Leipzig)

307. Jaensch, W., Ueber Wechselwirkung von optischen, zerebralen und somatischen Stigmen bei Konstitutionstypen. *Zeit. f. d. ges. Neurol. u. Psychiat.*, 1920, **59**, 104 ff.

Die in den vorstehend genannten Mitteilungen niedergelegten Resultate der Konstitutionsforschungen von W. Jaensch nahmen ihren Ausgang von der Untersuchung der subjektiven optischen Anschauungsbilder. W. Jaensch konnte feststellen, dass die subjektiven optischen Anschauungsbilder optische Korrelate gewisser, bei Jugendlichen stark verbreiteteter, Konstitutionstypen sind. Der B- (basedowoide) Typ äussert sich in leichtem Schwitzen, lebhaften Hautreflexen, niedrigem Hautwiderstand, weiter Lidspalte, lebhafter Pupillenreaktion und Glanzauge. Die Anschauungsbilder sind bei diesem Typ stark flexibel, leicht erzeugbar, meist sehr deutlich und besitzen positive Bildfarben, ihre Träger sind meist lebhaft und mitteilsam. Beim T-(tetanoiden) Typ findet sich starke galvanische und mechanische Erregbarkeit auf motorischem und sensorischem Gebiet und in ausgeprägten Fällen gelegentlich Uffenheimers Tetanie-Gesicht; die Anschauungsbilder, die gemäss der oft ängstlichen und schweigsamen Natur ihrer Träger bei diesem Typ häufig verschwiegen werden, haben meist negative Bildfarben, sehr hohe Starrheit und stehen überhaupt den negativen Nachbildern sehr nahe. Häufig nehmen sie Zwangscharakter an. Wenn die Stigmen beider Typen, was meist vorkommt, zusammen auftreten, spricht W. Jaensch vom TB-Typ. In Calciumgaben fand Jaensch ein Mittel, in leichten Fällen die Stigmen des T-Typs zu beseitigen, auch dann, wenn sie mit Stigmen des B-Typs gameinsam auftraten, ein Ergebnis, das für die Behandlung obsessiver Konstitutionen neue Möglichkeiten eröffnet.

O. Kroh (Göttingen)

308. Gottheil, E., Ueber das latente Sinnengedächtnis der Jugendlichen und seine Aufdeckung. *Zeit. f. Psychol.*, 1921, **87**, 73–90.

Zur Untersuchung wurden von Gottheil sowohl nichteidetische Erwachsene wie auch solche Jugendliche herangezogen, die bei direkter Untersuchung keine Anschauungsbilder zeigten. Aus der Grössenveränderung, die negative Nachbilder und projizierte Vorstellungsbilder bei diesen Individuen erlitten, sobald der Abstand des Projektionsgrunde verändert, bezw. ein homogener Projektionsgrund durch einen inhomogenen ersetzt wurde, konnte für die jugendlichen Beobachter der Schluss gezogen werden, dass bei ihnen nunmehr eine, sonst latente, Anschauungsbildkomponente

zur Geltung kam. Zum gleichen Resultat führten auch andere Versuche. So liess sich in manchen Fällen bei Projektion von Vorstellungsbildern auf Objekte der Wahrnehmung leichte Fahbenmischung beobachten; ebenso wiesen auch vergleichende Untersuchungen über den Einfluss der Kopfneigung auf die Lage der Vorstellungsbilder und Nachbilder sowie Untersuchungen über die räumliche Erschienungsweise der Vorstellungs- und Nachbilder auf das Bestehen rudimentärer Anschauungsbilder hin, obeohl direkte Prüfung auf Anschauungsbilder keinen positiven Befund ergeben hatte. "Hiermit ist wahrscheinlich gemacht, dass der eidetische Typus, in wie verschiedner Ausprägung er auch vorkommt, im Prinzip zu den regulären Kennzeichen einer gewissen jugendlichen Entwicklungsstufe gehört, und das er darum auch im Zusammenhang der normalen Entwicklung eine Bedeutung haben wird."

O. Kroh (Göttingen)

309. Jaensch, E. R. und W., Ueber die Verbreitung der eidetischen Anlage im Jugendalter. *Zeits. f. Psychologie,* 1921, **87**, 91–96.

E. R. und W. Jaensch geben eine kurze Zusammenstellung über die Verbreitung der eidetischen Anlage in einer Schulklasse von 38 Schülern mit dem Durchschnittsalter 12,35. Sie zeigen, in welcher Häufigkeit bei ihrem Material die verschiedenen Ausgeprägtheitsstufen und typischen Sonderformen der eidetischen Anlage auftreten.

O. Kroh (Göttingen)

310. Gösser, A., Gründe des verschiedenen Behaltens der einzelnen Gedächtnisstufen. *Zeit. f. Psychol.,* 1921, **87**, 97–128.

Gösser führt die Untersuchungen von P. Busse (Nr. 1 dieser Serie) und E. R. Jaensch bezüglich des verschiedenen Verhaltens der einzelnen Gedächtnisstufen (in aufsteigender Reihenfolge angeordnet: Nachbild, Anschauungsbild, Vorstellungsbild) fort. Er findet mit Hilfe ausgiebig variierter Versuche, 1. dass sich die Erscheinungsweise des Hintergrundes mit steigender Gedächtnisstufe von der wirklichen Beschaffenheit zunehmend entfernt. 2. dass die Verknüpfung der Gedächtnisbilder mit den gleichzeitig vorhandenen Wahrnehmungsinhalten umso lockerer wird, je höher die Gedächtnisstufe ist. Zusammenfassend formuliert Gösser, dass der Kohärenzgrad zwischen Gedächtnisbildern und den gleichzeitig gegebenen Wahrnehmungsdaten mit steigender Gedächtnisstufe abnimmt. Dieses Resultat wird dann auf die Lehre von der

Scheidung des Vorstellungsraums vom Wahrnehmungsraum angewandt und damit der Anschluss an Kandinsky, Störring und Rieffert gewonnen.

O. Kroh (Göttingen)

311. Jaensch, W., Uber psychophysische Konstitutionstypen (vorläufige Mitteilung). *Münchener med. Wochens.*, 1921, nr. **35**, 1001–1003.

Mit Hilfe der Weiss' schen Kapillaroskopie fand Jaensch bei Kratinismus und Myxödem Kapillarmissbildungen (Ranken-Sprossungs- und Kümmerformen). Kapillaruntersuchungen an Neugeborenen legten die Annahme nahe, dass derartige Missformen zum Teil durch Erhaltung der Jugendformen des Hautgefässnetzes entstehen. Hilfsschüler zeigten einen besonders hohen Prozentsatz solcher Kapillarformen, häufig auch andere Stigmen von Kretinismus und Myxödem (K- und M-Typen). Aus der Häufigkeit wird auf ein allgemeines Vorkommen von Hypo- oder Dysthyreose geschlossen. Die Kapillarmethode gibt ein Mittel zur Diagnose hypothyreotischer Störungen an die Hand, das im Verein mit der vom Verfasser beobachteten Steigerung der geistigen Fähigkeiten bei rechtzeitiger Thyreoidinbehandlung weittragende Perspektiven eröffnet.

O. Kroh (Göttingen)

312. Jaensch, E. R., Ueber neue Probleme der Gedächtnisforschung. *Rheinische Monats.*, 1921, 249–259.

In diesem Vortrag berichtet Jaensch zusammenfassend über einige Probleme und Ergebnisse der von ihm geleiteten Untersuchungen an optischen Anschauungsbildern. Es werden Fälle von Anschauungsbildern demonstriert, die untersuchten Fragen nach allgemeineren Gesichtspunkten betrachtet und Beziehungen zu modernen biologischen und physiologischen Gedächtnisuntersuchungen hergestellt.

O. Kroh (Göttingen)

313. Jaensch, W., Ueber Beziehungen von körperlichen und psychischen Eigenschaften der Persönlichkeit mit besonderer Rücksicht auf innere Sekretion und klinische Fragen (mit Demonstrationen). *Sonderabd. Sitzungsber. d. Gessel. z. Beförderung d. ges. Naturwiss. zu Marburg*, November, 1920.

Jaensch berichtet unter Berücksichtigung der vorliegenden Literatur über einige besonders ausgeprägte Fälle seines Materials

und deren Behandlung. Er stellt Beziehungen zu neurasthenischen und epileptoiden Krankheitsbildern her. Untersuchungen an Schwangeren ergaben ebenfalls einen hohen Prozentsatz von Eidetikern, ein Umstand, der geeignet erscheint, die Annahme zu stützen, dass die eidetischen Fähigkeiten auf besonderen innersekretorischen Vorgängen beruhen. Zur Lösung der Frage nach der Natur der Halluzinationen und ihrem Zusammenhange mit den subjektiven optischen Anschauungsbildern stellte Jaensch Versuche mit Anhalonium Lewinii an. Bei geringen Dosen der Droge zeigten Nichteidetiker schwache eidetische Fähigkeiten, Eidetiker mit schwachen Anschauungsbildern bekamen deutliche Anschauungsbilder, während die Anschauungsbilder guter Eidetiker halluzinatorischen Charakter annahmen, alles ohne Störungen des Bewusstseins und der Selbstkritik.

O. Kroh (Göttingen)

314. Voigt, W., Untersuchungen über das anschaulich-geometrische Denken der Zehnbis Zwanzigjährigen. *Zeit. f. päd. Psychol.*, 1921, **22**, 33–50.

Die Komponenten des anschaulich-geometrischen Denken abstrahierende, determinierende und kombinierende Phantasie werden mit drei verschiedenen Aufgabengruppenan männlichen und weiblichen Personen verschiedener Schulgattungen untersucht. Der Einfluss der Schulkenntnisse ist nach Möglichkeit ausgeschaltet. Die Leistungen des weiblichen Geschlechts stehen durchweg hinter denen des männlichen zurück. Sie lassen zwar besonders bei der Prüfung der determinierenden Phantasie geistige Beweglichkeit erkennen, die sich aber in unexaktem Herumprobieren äussert und klare Lösungswege nicht findet. Die Überlegenheit der höheren Schüler gegenüber den Volksschülern ist bedeutend. Koedukation im geometrischen Unterricht empfiehlt sich nach den Ergebnissen nicht.

Bogen (Berlin)

315. Griffitts, C. H., Affirmation and Negation. *Amer. J. of Psychol.*, 1922, **33**, 84–96.

Four experiments dealing with affirmation and negation were performed. In the first experiment, the subjects reacted differentially to the presence or absence of a given color, five other colors being used. The reactions to the presence of the color were more rapid than the reactions to its absence, and the positive color was always in the reactor's consciousness during the fore-period. The

second experiment consisted of the cancellation of groups of letters containing or not containing a given letter or combination of letters. A greater speed was obtained when cancelling the groups containing the given combinations. The subjects of the third experiment reacted differentially to the correctness or incorrectness of multiplication—equations of two one-digit numbers, reacting to correctness more rapidly than to incorrectness. In the final experiment, pairs of either identical or different letters were cancelled. The identical letters were cancelled more rapidly. When cancelling different letters, the identical pairs were picked out and the others cancelled. These results indicate that the statement frequently made, that all negation is affirmation, is not true from the standpoint of the psychological and neurological processes involved.

G. J. Rich (Pittsburgh)

316. Elliott, M., Comparative Cognitive Reaction-Time with Lights of Different Spectral Character and at Different Intensities of Illumination. *Amer. J. of Psychol.*, 1922, **33**, 97–112.

Cognitive reaction-times to numbers displayed visually were obtained under three sources of illumination (mercury vapor lamp, tungsten filament incandescent lamp, and diffuse sunlight), each used at six intensities varying from ½ foot-candle to 50 foot-candles. The continuous spectra light (diffuse sunlight and tungsten lamp) showed larger reaction-times than did line-spectrum light from the mercury vapor lamp at the same intensity, which is in line with the known fact that monochromatic light increases visual acuity. The reactions under sunlight were more rapid than those under the light of tungsten lamp. The differences were in both cases more marked at high than at low intensities. The minimum intensity of illumination for maximum efficiency in cognitive reactions appeared to be between 10 foot-candles and 20 foot-candles. Cognitive reaction-time affords a parallel to actual working conditions where the hand is directed by the eye.

G. J. Rich (Pittsburgh)

317. Wheeler, R. H., The Development of Meaning. *Amer. J. of Psychol.*, 1922, **33**, 223–233.

In an investigation of choosing, it was found that the observers not only gave a description of immediate content, so-called, but also interpreted this content even as it took place. The more detailed the introspection, the sooner after this content appeared did the reagent interpret it. These facts led to the conclusion that many of

our so-called unanalyzable mental processes are interpretations which the observers have failed to analyze, and that such "interpretive periods" are legitimate features of any introspection, provided they are recognized as such. These "interpretive periods" are no more and no less than the development of meaning. As shown by typical introspections, the development of meaning involves three stages: (1) the original or "given" process; (2) a subsequent process which interprets the first; and (3) a third process which constitutes a final interpretation. In other words there are (1) shifting or developing sensory and imaginal contents, along with which there arises a motor "set" or attitude. An image or group of images never "means" anything in the absence of this motor "set" or of verbal imagery. (2) These data develop by means of a peculiar broadening of the span of attention to the stage of consciousness of meaning. Here attitudes become conscious attitudes. (3) The motor set undergoes certain changes in emphasis and is supplemented by verbal imagery and further visualization of musculature. This constitutes an awareness that the meaning has been or now is recognized.

G. J. Rich (Pittsburgh)

318. Simpson, R. M., Creative Imagination. *Amer. J. of Psychol.*, 1922, **33**, 234–243.

Modern psychologists have failed to put upon creative imagination the emphasis it deserves because of its importance in life. Tests to ascertain either native intelligence or acquired knowledge do not determine creative ability. Creative ability is marked by the initiative which one evidences by his power to break away from the usual sequence of thought into an altogether different thought. Frequency of spontaneity in thought is the true measure of a person's creative capacities. The creative mind differs from the neurotic mind in that the new combinations of thoughts of the insane have no significant bearing on their past experience. In the test for creative ability, the subject is given a series of squares, each composed of four dots. For every square, he is instructed to add two "extra dots" in any position he desires and draw as many different designs or objects, in every case using all six dots, as he can in fifteen minutes. The results are the number of figures drawn and the number of creative changes. The data from a trial of the test on 407 pupils are given. Although the test deals primarily with a visual imagery stimulus to creative ability, it draws out the potential "logical" creative capacities of an individual.

G. J. Rich (Pittsburgh)

7. SOCIAL FUNCTIONS OF THE INDIVIDUAL

319. Bills, M. A., A Test for Use in the Selection of Stenographers. *J. of Applied Psychol.*, 1922, **5**, 373–377.

The results of using a battery of tests for the selection of stenographers are described in the *J. of Applied Psychol.*, Vol. 4. Further data have been collected five months later and are reported here, accompanied with data from supplementary groups.

Evidence is found that there is a positive relation between mental alertness as measured by Test VI of the Bureau of Personnel Research of the Carnegie Institute of Technology, and ability in stenographic work. The designation of a score of 60 in this test as a "critical score" for selecting stenographers is justified by the data secured.

E. Mulhall Achilles (Columbia)

320. Bills, M. A., Methods for Selection of Comptometer Operators and Stenographers. *J. of Applied Psychol.*, 1922, **5**, 275–286.

A study was made to determine if certain tests of the Bureau of Personnel Research of the Carnegie Institute of Technology would serve as a basis for the selection of applicants for courses in stenography and comptometer operation in a technical night school; and to determine if from a group of applicants it is possible to select successful comptometer and stenographic operators. A battery of tests was used rather than a single test with the idea that the more measures one could get the higher would be the ratio of success in selecting promising applicants. The results showed that a battery of tests is more effective both in eliminating failures and picking successes, than any single test. Of the single tests, general intelligence is the most efficient for selecting successes.

E. Mulhall Achilles (Columbia)

321. Pauli, R., Untersuchungen zur Methode des fortlaufenden Addierens. *Beiheft 29, Zeit. f. angew. Psychol.*, 1921, 172–187.

Das Zustandekommen der Gesamtleistung, der schriftlichen Addition, wird mit Rücksicht auf die Bedeutung der verschiedenen Teilleistungen untersucht: Lesen der Zahlen, reine Rechenoperation, Zahlenschreiben. Der Vergleich der Einzelleistungen zeigt ein Anwachsen der Streuung nach den ver wickelteren Operationen-Rechnen- hin. Die Schreibgeschwindigkeit wirkt hemmend auf die Hauptleistung ein. Die Versuchspersonengruppen lassen sich nach

den mittleren Leistungen in drei Stufen ordnen, deren niedrigste die 15 jährigen Mädchen repräsentieren. Die zweite Stufe umfasst Knaben und Arbeiter, die dritte gebildete Erwachsene. Die Analyse der Gesamtleistung berücksichtigt Veränderungen der Hauptleistung, wie sie das Rechnen und solcher, wie sie das Lesen und Schreiben bedingt. Als hemmende bezw. örfdernde Faktoren werden Zwischenerlebnisse und zeitsparende Verknüpfungen von Teilleistungen beschrieben.

H. Bogen (Berlin)

322. Rupp, H., Aus der Psychotechnik des subjektiven Schallmessverfahrens. *Beiheft 29, Zeit. f. angew. Psychol.*, 1921, 131–149.

"Der Schallmesser muss auf Schüsse hin, bei einigen Verfahren auf telefonische Reize hin reagieren." R.s Untersuchungen betreffen den Einfluss des Vorhandenseins oder Fehlens eines dem Reiz vorhergehenden Vorsignals, der Länge und Regelmässigkeit der Warnpause, des Tempos der Reizfolge, von Störingen, der Schallstärke der Reize, der Reizdauer, der Art der auszuführenden Reaktionsbewegung auf die Dauer und Regelmässigkeit der Reaktion und die Möglichkeit, die eigene Reaktionrichtig zu beurteilen, sowie sie hierbei verwendeten Urteilskriterein. Die Vermehrung der Beobachtungen schränkt den wahrscheinlichen "richtigen" Bereich etwa im Verhältnis von $1:\sqrt{n}$ ein. Es empfiehlt sich, mehrere Beobacher gleichzeitig zu verwenden und jeweilig nur die kürzeste ihrer Reaktionszeiten zu benutzen. Für jeden Beobachter ist an jedem Beobachtungstage seine jeweilige Reaktionszeit durch eingehende Kontrollversuche zu bestimmen, da die zufälligen Schwankungen im Verhältnis zu den individuellen Unterschieden sehr gross sind. Versuche über Richtungshören ergaben: die beidohrige Schallokalisation in querer, horizontaler Richtung ist etwa dreimal so gut als die in vertikaler Richtung. Das Verhältnis kehrt sich annähernd um, wenn der Kopf möglichst weit zur Seite gegen die Schulter geneigt wird. Fast ebenso schlecht wie die beidohrige Vertikal-Lokalisation ist die einohrige Horizontal-Lokalisation. Bezüglich der Fähigkeit zur Schall-Lokalisation scheinen grosse individuelle Unterschiede und geringe Übbarkeit zu bestehen. Der Schall scheint gegenüber seinem Ausgangsort meist nach *links* verschoben; es wird nachgewiesen, dass die uns gewöhnliche Art des Lesens hier für verantwortlich zu machen ist.

O. Lipmann (Berlin)

323. KAFKA, G., Zur Psychotechnik des Bremsens hei der elektrischen Strassenbahn. *Beiheft 29, Zeit. f. angew. Psychol.*, 1921, 102–106.

Übt vom psychophysiologischen Standpunkt aus Kritik an den horizontal liegenden Bremsvorrichtungen, die im Gefahraugenblick gegenläufige, distale Bewegungen erfordern. "Man verlege die Bewegung des Schalthebels und des Griffes der Kakuumbremse aus der Horizontalen in die Vertikale und bringe die Bremsen so an, dass sie in beiden Fällen durch einen Zug in proximaler Richtung, also gegen den Körper zu, in Tätigkeit gesetzt werden, während die Fahetstellung durch Vordrücken der Hebel erreicht wird."

H. BOGEN (Berlin)

324. GIESE, F., Zur Psychologie der Arbeitshand. *Beiheft 29, Zeit. f. angew. Psychol.*, 1921, 77–94.

G. entwickelt ein Forschungsprogramm. Als Greif- und Haltewerkzeug ist die Hand von stabilen Augsangsstellungen abhängig. Für die funktionelle Erschliessung der Arbeitshand ist ein "Bezugsraum" von bestimmtem Ausmass festzulegen. Die Erforschung der objektiven Seite des Arbeitvorganges hat Normen zu gewinnen für Präzision und Tempo. An *besonderen* Komponenten sind in den Kreis der Forschung Handenergie, Handruhe, Treff- und Zielsicherheit, Bewegungsfeinheit und Beweglichkeit einzubeziehen. Subjektive Komponenten sind Abhängigkeit der Naturgemässheit der Bewegung von der Ausgangsstellung, Abfolgen und unterbewusste Assoziationen. Weitere Probleme liegen in der Autonomie der Hand, Serienhandlungen und Dominanzfunktionen einzelner Teile der Hand. Als Forschungsmethoden werden die entwicklungspsychologische, pathologische, ferner die der Isolierung der Elemente aus dem Arbeitsganzen empfohlen.

H. BOGEN (Berlin)

325. RUPP, H., Eignungsprüfung für Telephonistinnen. *Beiheft 29, Zeit. f. angew. Psychol.*, 1921, 63–76.

R. hat eine Tabloprobe ausgebildet, die die Verbindungsarbeit der Telephonistin im Schema nachahmt. Er findet, dass man mehrere Werte zusammen nehmen muss, um zuverlässige Werte zu erhalten. Die Bewährungskorrelationen sprechen für praktische Verwendbarkeit der Probe. Aus einer grösseren Zahl auf Schwankung, Übung und Korrelation untersuchter Varianten ergibt sich, dass die individuellen Unterschiede mit wachsender Schwierigkeit grösser werden. Die Fehlerzahlen weisen so grosse Schwankungen auf, dass ihre

Einbeziehung in die Bewertung nicht angängig erscheint. Die Gefahr des Rangzerfalls besteht in der Probe nicht.

H. Bogen (Berlin)

326. Streller, J., Die Berufseignung des mittleren kaufmännischen Bureaubeamten im Buchhandel. *Zeit. f. angew. Psychol.* 1922, **19**, 342–392.

Die Haupttätigkeit des Berufausübenden besteht in gewissen Übertragungen. Bei ihnen kommt es an auf Aufnahme des Inhalts einer Bestellung in den Besitzstand des Bewusstseins, Bewahrung des Inhaltes vor aktiven Störungen, schriftliche Wiedergabe des Bewusstseinsinhaltes. Zur Prüfung dieser Eigenschaften wird die als Gedächtnisprobe häufig benutzte Zahlenprobe so umgestaltet, dass sie eine Messung des Widerstandes gegen Störungen während des Merkvorganges zulässt. An allgemein erforderlichen intellektuellen Eigenschaften werden Konzentrationsfähigkeit (Bourdon), gleitende Aufmerksamkeit (Punktzählprobe), Geschwindigkeit der Begriffsbildung (Farbenbenennungsprobe) geprüft. Die direkte Bewährungsprobe ziegte den Koeffizienten $r = +0{,}97$. Untereinander stehen die Tests in schwacher oder garnicht in Korrelation. Den höchsten Symptomwert für die Gesamtleistung weist der Punktzähltest auf. Zur Anwendung des Verfahrens werden Formeln gewonnen, die eine Zusammenfassung der Einzelleistungen in *eine* Zahl gestatten.

H. Bogen (Berlin)

327. Weidemann, F., Der Werkzeugmacherlehrling und seine Eignungsprüfung. *Der Betrieb,* 1921, **4**, 121–122.

Die Analyse geht von den im Beruf auszuführenden Handarbeiten aus. Es kommen in Frage: Gerade Führung beider Hände, Ausübung eines gleichmässigen Druckes durch beide Hände, Abwägen von Gewichten, Feingelenkempfinden der Hand, Empfindlichkeit gegen Reibungswiderstände beim Messen mit Bolzenlehren, Augenmass, Tastgeführ, Treffsicherheit beim Hammerschlag und gleichzeitiger Bewegung resp. Drehung der linken Hand, Helligkeitsempfinden des Auges, Farbenblindheit.

H. Bogen (Berlin)

328. Heilandt, A., Über die Bewährung psychotechnischer Eignungsprüfungen gewerblicher Lehrlinge. *Der Betrieb,* 1921, **4**, 118–120.

Ein Vergleich der Eignungsprüfung an Metallarbeiterlehrlingen mit ihrer Bewährung nach 1—1½ jähriger Werkstattpraxis ergibt

die Brauchbarkeit psychotechnischer Verfahren. Hervorzuheben ist die theoretische Analyse der die Rangreihenverschiebung bedingenden Faktoren.

H. Bogen (Berlin)

329. Waldau, M., Psychotechnische Eignungsprüfung von anzulernenden Arbeiterinnen der elektrotechnischen Massenherstellung. Methoden und deren Bewertung. *Der Betrieb*, 1921, **4**, 110–117.

Die Methode wird zur Auslese von Arbeiterinnen für die Montageabteilung von Sicherungsstöpseln verwendet. Die Arbeiterinnen werden in einer allgemeinen Prüfung auf Sehschärfe, Aufmerksamkeit, optisches Gedächtnis, geistige Regsamkeit und Handgeschicklichkeit begutachtet. Bei Versagen in der Arbeit tritt eine Spezialprüfung zur Festlegung des Eignungsschwerpunktes zum Zweck der Zuteilung an entsprechende Beschäftigung ein. Die Prüfmethoden stellen Schemata der reellen Arbeitsvorgänge dar. Verfahren wird durch instruktives Bildmaterial und zahlreiche abgedruckte Bewertungskurven demonstrient.

H. Bogen (Berlin)

330. Goldschmidt, R. H., Die Beziehung zwischen Eignungsprüfung und Berufsberatung. *Psychol. Mitteilungen*, 1921, **2**, 25–28.

Charakterisiert die Eignungsprüfung als wirtschaftlichen Ersatz der Probeanlernzeit und die praktischen Massnahmen, die nötig sind, um sie zu einem zuverlässigen Hilfsmittel der Berufsberatung zu gestalten.

H. Bogen (Berlin)

331. Lysinski, E., Die Psychologie im Dienste der Unfallverhütung. *Psychol. Mitteilungen*, 1921, **2**, 49–53.

Die Unfallpsychologie als Zweig der Wirtschaftspsychologie hat die psychologischen Ursachen der Betriebsunfälle zu enforschen und die psychologisch richtige Durchbildung der Unfallverhütung zum Ziel. Die betreffenden Spalten von Unfallzählkarten müssen künftig Möglichkeiten der Angabe psychischer Unfallursachen enthalten. In zweiter Linie hat die Erforschung der Ursachen von Betriebsunfällen durch das Laboratioriumsexperiment zu erfolgen. Genaueres Studium des Einflusses der Ermüdung, der Arbeitdauer, des Wochenverlaufs, der Akkordarbeit und des Alters als bisher ist anzustreben. Die Unfallverhütungsvorschriften sind nach psycholo-

gisch-pâdagogischen Gesichtspunkten in klare und eindrucksvolle Form zu bringen. Auf Gesaltung und Plazierung der Warntafeln und Signale sind die Grundsätze der Reklamepsychologie anzuwenden. Schutzvorrichtungen am Menschen dürfen seine psychophysiche Leistungsenergie nicht herabmindern. Für die Schutz vorrichtungen an der Maschine ist grösste Sinnfälligkeit und Naturgemässheit ihrer Bedienungsbewegung festzustellen.

H. Bogen (Berlin)

332. Weber, J., Arbeitpsychologische Probleme. *Psychol. Mitteilungen,* 1921, **2**, 61–65.

Programmatischer Aufsatz über die im Arbeitstoff, Arbeitträger und Arbeitvorgang liegenden seelisch wirkenden Besonderheiten.

H. Bogen (Berlin)

333. Weber, J., Die Eignungsprüfung bei "Rheinmetall" in Düsseldorf. *Psychol. Mitteilungen,* 1921, **2**, 145–150.

Geprüft werden Lehrlinge. Die psychophysische Prüfung erstreckt sich auf Augenmass (Mittelpunktsbestimmungen, Ordnen von gehrümmten Linien, Ordnen von Eisenstücken nach ihren optisch erkennbaren Grössenunterschieden), Zeitsinn (mit verschiedener Geschwindigkeit sich drehende Scheiben auf gleiche Tourenzahl einstellen), Tastsinn (Ordnen nach Dicke und Glätte), Gelenksinn (Ordnen von Gewichten, Gleichmachen ungleicher Gewichte), Aufmerksamkeit (Bourdon), Handbetätigung (Zielschlagen mit Spitzhammer, gleichzeitiges Arbeiten mit beiden Händen, Nachziehen einer vorgezeichneten Figur), Reaktionsgeschwindigkeit, Anschauungsvermögen, Intelligenz, technisches Verständnis (Erklären von Bildern alter Maschinen nach bestimmtem Frageschema).

H. Bogen (Berlin)

334. Weber, J., Die Lehrlingsauslese bei der Dortmunder "Union" (Deutsch-Luxemburgische Bergwerks- und Hütten- A.- G.). *Psychol. Mitteilungen,* 1921, **2**.

Auslese von Anwärtern für alle Zweige der Metallarbeit. Zunächst findet eine Prüfung auf eine gewisse Allgemeinbefähigung zur Absonderung der guten Hälfte der Anwärter statt. Die letzteren werden einer Spezialprüfung unterzogen, um aus ihnen für jede Gruppe des Berufs die Bestgeeigneten herauszufinden. Mitbewertet wurden die Schulzeugnisse. Das Schema der Prüfung entspricht etwa dem bei "Rheinmetall" (siehe oben). Als neu ist hervorzuheben, dass aus einer Reihe einfacher Aufträge, die jeder

Prüfling zu erledigen hatte, ein Gesamt*eindruck* der handelnden Persönlichkeit durch Beobachtung auf Zuverlässigkeit, Sicherheit, Richtigkeit, Geschicklichkeit, Körperhaltung und dergleichen gewonnen wurde.

H. Bogen (Berlin)

8. SPECIAL MENTAL CONDITIONS

335. Le Heux, J. W., Cholin als Hormon der Darmbewegung. III. Mitteilung. Die Beteiligung des Cholins an der Wirkung verschiedener organischer Säuren auf den Darm. *Arch. f. d. ges. Physiol.*, 1921, **190**, 280–300.

Mitteilung I klärte die Rolle des Cholins als Hormon der Darmbewegung auf. Mitteilung II führte die wechselnde Atropinwirkung auf den Darm auf wechselnde Cholinmengen in ihm zurück. Mitteilung III macht nun in "hohem Grade wahrscheinlich," dass die Reizwirkung der Salze einiger organischer Säuren auf den Dünndarm dadurch zustande kommt, dass diese Salze mit dem in der Darmwand vorhandenen Cholin mittels eines synthetischen Fermentes Cholinester bilden, die den Darm Stärker als Cholin selbst reizen und dadurch erhöhte Bewegungstätigkeit veranlassen. Die Wirkungsstärke war bei: Cholinester der Essigsäure—1000 mal; der Propionsäure—300 mal; der Ameinsensäure—100 mal; der n-Buttersäure—40 mal; der Isovaleriansäure, 15 mal; der Benzoesäure—2 mal; der Bernsteinsäure—1 mal; stärker als die des Cholins.

Happel (Frankfurt a/M.)

336. Le Heux, J. W., Cholin als Hormon der Darmbewegung. IV. Mitteilung. Ueber den Einfluss des Cholins auf die normale Magen-Darmbewegung. *Arch. f. d. ges. Physiol.*, 1921, **190**, 301–310.

Die Verdauungsbewegungen das Magendarmkanals, die ohne Einfluss des Centralnervensystems nahezu normal ablaufen können, sind vom Auerbachschen Plexus abhängig, dessen Erregungen durch das Cholin zustande kommen. Verf. prüfte diesen Einfluss des Cholins auf die Magendarmverdauung mittels Röntgenaufnahmen an Katzen. Geringe Erhöhung des Cholingehaltes des Körpers bewirkt Verkürzung der die Nahrung vom Magen in den Dickdarm befördernden Verdauungsperiode. Am Magen treten verstärkte Antrumperistaltik und frühere Entleerung auf, am Dünndarm frühere Füllung, Zunahme der Pendelbewegungen, kräftige

rhytmische Segmentierung des Inhaltes und verstärkte Peristaltik. Am Dickdarm: frühere Füllung, keine sichtbare Peristaltikverstärkung, jedoch Uebergangsbeschleunigung vom proximalen in das distale Colonende. Die Darmbewegungen sind nicht krampfartig!

HAPPEL (Frankfurt a/M.)

337. KÜHLWEIN, M., Cholin als Hormon der Darmbewegung. V. Mitteilung. Experimentelle Therapie der Magen-Darmlähmung nach Chloroformnarkose. *Pflügers Arch. f. d. ges. Physiol.*, 1921, **191**, 99–107.

K. untersuchte an Katzen die steigernde Wirkung des Cholins auf die Magendarmbewegung nach deren Lähmung durch Chloroformnarkose. Cholin-H Cl intrvenös injiziert wirkt "heilend auf diese Lähmung" und deren Folgeerscheinungen. Das Benehmen der Katzen ist schon nach 1 Stunde fast normal. Nach 4 Stunden (ohne Ch. 7 Stunden!) zeigen sie starke Fresslust. Nach K.'s Untersuchungen bewirkt CH Cl_3–narkose keinen Cholinverlust, sondern verminderte Erregbarkeit des Auerbachschen Plexus auch gegenüber dem Cholin. Daher wird, um diesen zu erregen, eine grössere als normale Cholinmenge benötigt. K. sah keine schädigenden Wirkungen.

HAPPEL (Frankfurt a/M.)

338. SCHÖNFELD, H., Der Kreatingehalt des Froschmuskels im Zustande der hypnotischen Starre. *Arch. f. d. ges. Psysiol.*, 1921, **191**, 211–216.

Schönfeld hat Frösche 3 Stunden lang in hypnotischer Starre (Rückenlage) gehalten und danach die Muskeln (Adduktoren) der Tiere auf Kreatin unteesucht. Er fand einen um 21% erhöhten Kreatingehalt bei den Hypnosetieren. Er führt die Erhöhung des Kreatingehaltes zurück auf den Tonus der Muskeln in der Hypnose, der ein anderer sein muss als der Ruhetonus, bei dem in allgemeinen keine Erhöhung des Kreatingehaltes gefunden wird. Einen Zusammenhang der Steigerung des Kreatingehaltes mit Kreislaufstörungen, die durch die Hypnose veranlasst sein könnten, hält Sch. nicht für wahrscheinlich.

STEINHAUSEN (Frankfurt a/M.)

339. DUNLAP, K., Sleep and Dreams. *J. of Abnor. Psychol.*, 1921, **16**, 197–201.

A survey of the numerous physiological theories of sleep cannot fail to create the impression that so far as the ultimate causes are concerned, sleep is still a great mystery. A considerable knowledge

of the actual conditions of sleep, apart from the ultimate causes, may be had, however, and the author here presents some of the factors comprising such a knowledge.

Lessened reactivity in general and a decrease in blood pressure mark the most important physiological accompaniments. Exception must be made in the case of the sex organs and possibly also the digestive organs. Psychologically, we notice the lowering of attention (hence of integration), the reduction of its range, and the interruption of the normal association processes in the loss of selective control. Abolition of the learning process also occurs. From these facts a theory is drawn on the basis of which one might predict that dreams would occur. The idea that two or three dreams may occur simultaneously is due to the greater ease of organization of the fragmentary and apparently nonassociated details into several narrations than into one. Memory requires a high degree of integration, a situation existing in the reverse in dream-states.

Causes are more difficult to establish; organic conditions and emotional states being the most important. Of the emotions, although the anticipatory are probably the most important, others may enter in. The danger in the symbolic interpretation of dreams lies chiefly in determining the true symbolization. Lack of experimental data is largely due to the extreme difficulty of experimental technique and to the great expense attached to any comprehensive investigation of the matter.

J. P. Currie (Boston Psychopathic Hospital)

340. Dück, J., Schrift und Suggestion, beziehentlich Hypnose. *Praktische Psychol.*, 1922, **3**, 110–114.

Bei der Tätigkeit als Gerichtssachverständiger für Schriftfragen ist aufgefallen, dass einzelne Menschen mit starker Einfühlungsfähigkeit in der Schrift eine ungewöhnliche Variationsbreite aufweisen. An einer Versuchsperson, die durch Suggestion und leichte Hypnose in verschiedenste Lebenskreise versetzt, ihre Handschrift fortdauernd verändert, wird die Vermutung verifiziert. Es werden Schriftzüge mit so heterogenen Formen produziert, dass ihre Identifizierung auch dem erfahrenen Graphologen nich möglich ist.

H. Bogen (Berlin)

341. Klutke, O., Beiträge zur psychotechnischen Eignungsprüfung für den Fernsprechdienst. *Praktische Psychol.*, 1922, **3**, 93–110.

Der Urheber des Verfahrens hat zum Zweck eingehender Analyse des Arbeitsvorganges selbst Dienst als Vermittlungsbeamter getan.

Das Verfahren enthält: Konzentrationsprobe bei Dauerbeanspruchung, Zuordnungsreaktionen mit und ohne Hemmungsreize, Probe auf Aufmerksamkeitsumfang bei freier Wiedergabe des Behaltenen, auf Aufmerksamkeitsspannung bei Aufmerksamkeitswanderung, akustische Auffassungsprobe, Auffasungs- und Wiedergabeprüfung- für optisch dargebotene Zahlenschemata und Tabellen, Probe für Mehrfachaufmerksamkeit und Mehrfachhandlung. Die einzelnen Proben werden zum grössten Teil an selbst registrierenden Apparaten abgenommen. Die Auswertung geschieht nach der Fehlermethode, die Bewertung nach besonderen Masstäben, die in Eichungsversuchen gewonnen worden sind. Die Erfolgskontrolle wies praktisch wertvolle Ergebnisse zwischen Prüfung und späterem Leistungsbefund auf.

H. Bogen (Berlin)

342. Lenk, Das Gedächtnis im wachen und hypnotischen Zustand. *Zeits. f. angew. Psychol.*, 1921, **19**, 393–399.

Im suggestiven Zustand einmal erlerntes Material wird viel besser behalten. Aus dem Tatbestand wird hergeleitet, dass unbewusst erfasste Vorgänge besser festgehalten werden als bewusste. Die Erkenntnis wird in ihrer besonderen Beduetung für die Psychanalyse erörtert.

H. Bogen (Berlin)

343. Weber, J., Zur Psychotechnik der Reklame. *Der Betrieb*, 1921, **4**, 122–126.

Verfasser bearbeitete auf dem Wege statistischer Untersuchung die Ausnutzung der Tiefenwirkung der Reklameplakate. Für die Verteilung von Helligkeits- und Farbenunterschieden sind drei Helligkeitsgrade oder Farbstufungen zu wählen, die im günstigsten Wirkungsgegensatz zueinander stehen. In Verbindung mit plastischer oder perspektivischer Darstellung der Sache oder der Buchstabenform ist der dunklere Ton in die Seitenflächen der Zeichnung zu nehmen. Perspektivischer Mittelpunkt und sachlicher Hauptteil der Reklame müssen zusammenfallen. Bei plastischer Buchstabenform erzielen die nach rechts schräg rüchwärts gerichteten Tiefenlinien höheren Beachtungswert.

H. Bogen (Berlin)

344. Katz, D., Zur Psychologie des Amputierten und seiner Prothese. *Zeits. f. angew. Psychol. Beiheft 25.* 1921, p. 118.

Amputierte verzichten in grosser Zahl auf die Verwendung ihrer Prothese bei der Arbeit. K. will der notwendigen Psychologisierung

der Prothese die Grundlage verschaffen. In systeematischen Beobachtungen an Armamputierten giebt er Einblick in die Illusion des Phantomgliedes. Aus experimentellen Untersuchungen über Sinnes empfindlichkeit und praktische Leistungfähigkeit der Stümpfe ergibt sich, dass Druck- und Raumschwellenempfindlichkeit am Stumpf besser sind als an der korrespondierenden Stelle des erhaltenen Gliedes. Die Lokalisation von Tasteindrücken am Stumpf ist herabgesetzt, jedoch übbar. Die Erkennung von Oberflächenstrukturen gelingt mit dem Stumpf gut und iässt sich steigern. Taktilen Zahebildern und Objekten gegenüber versagt der Stumpf. Die weiteren Untersuchungen über die Unterschiedsempfindlichkeit für Gewichtsreize bringen Klärung in manche noch offenstehende Frage der Psychologie des Kraftsinns. So wird die geringe Bedeutung, die das Mehrgewicht des gesunden Armes auf die Unterschiedsempfindlichkeit ausübt, nachgewiesen.

H. Bogen (Berlin)

9. NERVOUS AND MENTAL DISORDERS

345. v. Schuckmann, W., Sensorische Aphasie nebst. Bemerkungen zur Gedächtnispathologie. *Monats. f. Psychiat. u. Neurol.*, 1920, **48**, 232–253.

Eine in der Hauptsache auf das hintere Dritten der linken oberen Schläfenwindung und den linken Gyrus supramarginalis beschränkte Rindenatrophie schädigte bei einem Rechtshänder Spontansprache, Nachsprechen und Lesen um etwa 30–40%, das Sprachverständnis nur um etwa 10%. Wortfindung ohne Empfindungsreize, also auf Grund der blossen Vorstellung in bekannter Weise sind viel stärker gestört als Bezeichnung gesehener oder berührter Objekte auf Grund des aktuellen optischen bzw. taktilen Reizes. Eine Zyste im Mark des linken Gyrus supramarginalis wird als Ursache der totalen Agraphie betrachtet. Zur Erklärung der nur schwach ausgeprägten Paralexie (im Gegensatz zu der starken Paraphrasie) wird an die Möglichkeit einer direkten Verbindungsbahn zwischen "Lesezentrum" und motorischen Sprachzentren gedacht. Zum Schluss folgen Bemerkungen zur Gedächtnispathologie vom Standpunkt der Semonschen Mnemelehre. Verf. will hyperästhetische, normalästhetische, hypästhetische und anäthetische Engramme unterscheiden.

Th. Ziehen (Halle)

346. Bickel, H., Ueber die Entstehung der Trugwahrnehmungen. *Monats, f. Psychiat. u. Neurol.*, 1920, **48**, 307–326.

Nach. Verf. liegt dem Auftreten von Trugwahrnehmungen eine allgemein kortikale Disposition zugrunde. Je nach der Disposition sind assoziative und dissoziative Trugwahrnehmungen zu unterscheiden. Die Auslösung erfolgt teils intellektuell, teils affektiv, teils sensorisch, teils durch "Impulse aus dem Bereich des Unterbewussten."

Th. Ziehen (Halle)

347. Münzer, A., Über die Bedeutung der inneren Sekretion für die Psychiatrie. *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, **63**, 530–550.

Für die Psychologie interessant ist nur die Feststellung, dass unter der Einwirkung der Blutdrüsen stets gerade das Affektleben sich verändert. Die veränderten Affektausschläge erfolgen bald nach der positiven bald nach der negativen Seite, auch trägt die einzelne Affektstörung je nach dem Leiden ihre besondere Note (so ist z.B. die klimakterische Depression von der diabetischen verscheiden), aber der Gesamttypus der Affektschädigung bleibt unverkennbar. Am tärksten ist der Einfluss der Schilddrüse. Wesentliche Einwirkungen auf das intellektuelle Leben scheinen nicht vorzukommen.

Th. Ziehen (Halle)

348. Sittig, O., Störungen im Verhalten gegenüber Farben bei Aphasischen. *Monats. f. Psychiat. u. Neurol.*, 1921, **49**, 63–88; 159–186.

Auf Grund dreier eigener Fälle (psychologische Untersuchung nur in 1 Fall einegermassen ausreichend) kommt Verf. u.a. zu dem Ergebnis, dass eine Summation von aphasischen und optisch-agnostischen Störungen anzunehmen ist. Meist scheint auch hier eine Superiorität der linken Hemissphäre vorzuliegen.

Th. Ziehen (Halle)

349. Janet, P., The Fear of Action. *J. of Abnor. Psychol.*, 1921, **16**, 150–160.

The point is made that the phobias of diverse objects and diverse situations, as the professional phobias, mysophobias, agoraphobias, erythrophobias, etc., are at bottom phobias of actions which are

provoked or called forth by these objects and these situations. Cases beginning with " meticulous habits of verification," in the end manifest fear for the objects or situations related to the activities. The " mania " becomes a phobia, both of which involve fear in the domain of executive action. Analogous is the " reversal of sentiments " in which for the action desired there is an apparently irresistible impulse to do the opposite action (Cf. the negativism of schizophrenia). In normal activity, sufficient and even superabundant energy is mobilized; unexpended energies enhance the sense of ultimate achievement, the sentiment of triumph and the joy accompanying well performed action. The available energy may be but just sufficient, when the performance is a drab affair, without " passion of accomplishment." If the disposable energies are frankly insufficient, the activity will take on distinctive features, lacking reflective and rational intermediaries, and possibly " under the form of a mere perception or reflex action." This is a process as painful as to " lie on the bare ground when one is used to a good bed. * * * It is as if the mentality were required to possess a certain fortune * * * in the case we are now considering the credit balance is very bad and the mind is up against bankruptcy." Accordingly it is considered that in disturbances of the type under consideration, one is " always concerned with mere depressions of activity, more or less profound, either involving the mind as a whole, or bearing down upon some one tendency or group of tendencies. The energy of performance being diminished * * * the process of activation can no longer attain the superior forms of behavior * * * such fears are manifested only when the subject is seeking to energize his performance under its higher form; thus, acting at a level of expenditure too costly for his budget of available resources."

F. L. Wells (Boston Psychopathic Hospital)

10. INDIVIDUAL, RACIAL AND SOCIAL PSYCHOLOGY

350. Fletcher, J. M., The Miracle Man of New Orleans. *Amer. J. of Psychol.*, 1922, **33**, 113–120.

An account is given of the visit of a faith healer to New Orleans in the spring of 1920. The crowd-phenomena attendant upon his visit are described, with numerous examples.

G. J. Rich (Pittsburgh)

351. Spaulding, E. R., The Rôle of Personality Development in the Reconstruction of the Delinquent. *J. of Abnor. Psychol.*, 1921, **16**, 97–114.

Although studies have been made of large groups of criminals to discover the incidence of factors of heredity, physical condition, intellectual capacity, environmental conditions, educational and industrial training and mental status, an element often neglected is that of personality development, especially with relation to possibilities of social reconstruction. Mental defect is less apt than personality defect to make an individual anti-social. The field of personality offers a most productive field for study. Three viewpoints should be taken into consideration: the medical, studying the glands of internal secretion; the psychological, making studies of aptitudes and disabilities; that of psychiatry, studying the individual's mental status and applying to his conduct theories which have helped in understanding other individuals. There are three opportunities for studying personality traits of delinquents in penal institutions: the mental test, the social worker's history, the period of observation in the institution. A special study of two girls made at the New York State Reformatory at Bedford Hills is discussed in detail. The girls' history, conduct and mental status were very similar and the fact that they made widely differing adjustments to their environment after leaving the institution was felt to be largely due to differences in personality.

R. W. Washburn (Radcliffe College)

352. Kiesel, W., Das Ausdrucksproblem in der Kriminalistik. (Grundzüge einer forensischen Psychomimik.) *Arch. f. Krim.*, 1920, **72**, 1–30.

353. Margulies, M., Uber Ausdrucksfähigkeit und Erleben. (Bemerkungen zur Arbeit von Kiesel.) *Arch. f. Krim.*, 1921, **73**, 93–100.

Der Ausdruck muss als vollwertiges Beweismittel in die Kriminalpraxis eingeführt und die Ausdrucksdeutung auf genügend sichere, von Subjektivität freie Grundlagen gestellt werden. Es handelt sich dabei um die Feststellung und Deutung 1. der vorübergehenden Ausdruckssymptome, 2. der Dispositionssymptome, d.i. der somatischen und psychischen Besonderheiten chronischen Charakters, von denen die Reagibilität des Individuums im Einzelfalle abhängt; hierbei ist noch zu unterscheiden die Disposition a zu Gefühlserlebnissen überhaupt, bi zu ausdrucksmässigem Reagieren auf

Gefühlserlebnisse. Wenn der Kriminalist sich die Psychomimik zu Nutze machen will, so bedarf er einer Schulung in der intuitiven Ausdrucksdeutung an der Hand wissenschaftlicher, die Sicherheit des Ergebnisses garantierender Methoden.

Während Kiesel im Wesentlichen nur an die Gesichtsmimik denkt, fordert Margulies eine Psycho-*Panto*mimik, weil der ganze Körper Organ der Ausdruckstätigkeit ist. Margulies referiert dann über ein früher von ihm entwickeltes psychologisches System, das es insbesondere unternimmt, das Verhältnis zwischen sinnlichen (Empfindungen) und unsinnlichen (Gefühlen, Strebungen) psychischen Inhaltes zu klären. Aus den Ausdrucksbewegungen erfahren wir mancherlei sowohl über Inhalte wie über Zustände des psychischen Erlebens. Auch M. weist auf die Wichtigkeit dieser Ausdruckssymptome für die Kriminalistik hin und belegt dies durch einige Beispiele.

O. Lipmann (Berlin)

354. Göring, M. H., Der Wert der neuen Forschungen auf dem Gebiete der inneren Sekretion für die Kriminalpsychologie. *Arch. f. Krim.*, 1921, **73**, 243–246.

Es ist für den Kriminalpsychologen besonders wichtig zu wissen, dass bestimmte Anomalien des Körperbaues einen Rückschluss auf die innersekretorische Organisation der Körpers zulassen, ferner dass der Charakter und die Affektivität zweifellos in engstem Zusammenhange mit der innersekretorischen Tätigkeit des Körpers stehen. Gerade der Charakter eines Menschen ist aber für seine soziale Wertung von grösster Beduetung.

O. Lipmann (Berlin)

355. Hulst, J. P. L., Beitrag zur Kenntnis der Nekrophilie und des Nekrosadismus. *Arch. f. Krim.*, 1921, **73**, 205–242.

Hulst stellt Fälle von Nekrophilie und Nekrosadismus, die ihm aus seiner gerichtsärztlichen Tätigkeit bekannt geworden sind, mit einigenin der Literatur beschriebenen zusammen. Die sexuellen Abweichungen bilden im Allgemeinen eine ununterbrochene Reihe vom normalen Verhalten bis zu den stärksten Abweichungen; die künstlich getrennten Typen sind durch Ubergangsfälle verbunden; in diese Reihe gehören auch Nekrophilie und Nekrosadismus. Weder gehören die beschriebenen Personen einer einheitlichen Gruppe an, noch sind ihre abnormen Handlungen als Folgen einer einheitlichen Geistesstörung zu betrachten, noch ist ihre Zurechnungs-

fähigkeit allgemein zu verneinen. Bei den meisten aber diese oder jene Form geistiger Erkrankung vor, sie sind fast alle erblich belastet.

O. LIPMANN (Berlin)

356. HENNING, H., Die Geheimzeichen des Casseler Einbruchs im Lichte der Psychologie. *Arch. f. Krim.*, 1920, **73**, 70–77.

357. RUBNER, J., Lösung der Geheimschrift des Casseler Einbruchs. *Arch. f. Krim.*, 1921, **74**, 67–69.

Henning entnimmt aus dem Geheimschrift-Text, der 45 Zeichen und zwar 18 verschiedene enthält, Andeutungen für die "Geistesstruktur des Schreibers, nämlich unter anderm: dass der Schreiber eine" abstrakte Denkstruktur besitzt, dass er kein Berufsvertreter ist, dass er ein Jugendlicher ist, dass ihm das Schreiben der griechischen Schrift geläufig ist, usw. Hennings Entzifferungsversuch, auf den er übrigens selbst weniger Wert legt, ist falsch. Rubner gibt eine andere, völlig befriedigende Lösung. Von besonderem Interesse sind die Mitteilungen Rubners über seine Lösungsmethode.

O. LIPMANN (Berlin)

358. STERN, E., Über Schuld und Zurechnungsfähigkeit von Standpunkt der Psychologie der Wertung. *Arch. f. Krim.*, 1920, **73**, 1–17.

Zu einer "Schuld" kommt es, wenn ein Wertungserlebnis keine Motivationskraft gewinnt. Wertungen sind nur möglich, wenn der wertende Mensch bereits eine Wertsphäre in sich trägt. In die Sphäre der moralischen Wertung geht als mitbestimmender Faktor auch die Furcht vor der Strafe ein. Bei der vorsätzlichen Handlung negiert der Täter die Gesetzesormen nicht mit seiner Vorstellung sondern mit seinem Willen. Im Falle der Fahrlässigkeit liegt die eigentliche Wertung auf dem Gebiete der Erkenntnis, und die moralische Wertsphäre wird erst mittelbar davon betroffen. Unzurechnungsfähigkeit liegt dann vor, wenn die Wertsphäre aufgehoben oder krankhat verändert ist.

O. LIPMANN (Berlin)

11. MENTAL DEVELOPMENT IN MAN

359. SCHÜSSLER, H., u. SCHWARZHAUPT, W., Die pädagogische und experimentell-psychologische Auslese der Begabten für die Übergangsklasse II in Frankfurt am Main. *Zeits. f. päd. Psychol.*, 1921, **22**, 188–195.

Neben einer pädagogischen Prüfung wurde eine Fähigkeitsprüfung veranstaltet, in der die Aufmerksamkeit durch den Bour-

dontest und das Rechnen im Fünfersystem, die Beobachtungfähigkeit im Faltversuch und Diktatzeichnen, mechanisches und logisches Gedächtnis, die sprachliche Kombination durch einen Lücken- und Dreiworttest und das logische Denken durch Telegrammtest und Lösung von Schlussfiguren geprüft wurden. Ein Vergleich beider Prüfungsarten zeigte in Bezug auf die Rangierung der Schüler erhebliche Unterschiede.

BOGEN (Berlin)

360. STERN, W., u. ROLOFF, H. P., Psychologische Auslese der Lehrlinge für deutsche Eisenbahnwerkstätten. Vorläufige Mitteilung. *Zeits. f. päd. Psychol.*, 1921, **22**, 50–61.

Neben der speziellen technische-manuellen Prüfung ging eine der Allgemeinintelligenz her. Die Alleinherrschaft des Experiments wurde überwunden durch Verwendung der Ergebnisse psychologischer Schulbeobachtung des Schulzeugnisses und eines Schüleraufsatzes über die eigene Berufswahl. Die nicht aufgenommenen Knaben wurden mit dem Prüfungszeugnis der Berufsberatung überwiesen. Geprüft wurden Auge, Ohr, Tast-, Muskel-, und Gelenkempfindlichkeit, Handgeschicklichkeit, Reaktionsfähigkeit, Raumanschauung, technische Begabung und Intelligenz. Die Prüfungsergebnisse wurden durch Errechnung einer Prozentpunktzahl—Quotient aus Mindestleistung minus zu bewertender Leistung und Mindestleistung minus Bestleistung, multipliziert mit 100—auf vergleichbare Grösse gebracht. Die Prozentpunktzahlein wurden mit der Gewichtsziffer der Berufsfunktion multipliziert und dann zu einer Gesamtpunktzahl addiert.

BOGEN (Berlin)

361. HUTH, A., Zur Feststellung der geistigen und sittlichen Berufsanforderungen. *Zeit. f. päd. Psychol.*, 1921, **22**, 259–261.

Um das psychische Profil eines Berufsanwärters dem des Berufes zuordnen zu können, bedarf es einer Kenntnis der Berufsanforderungen der einzelnen Berufe. Verfasser teilt ein Schema mit, das dazu dienen soll, diese Kenntnisse herbeizuschaffen, und macht Vorschläge über die Verwendung dieses Wissens bei den vorbereitenden Massnahmen der Schule für die Berufswahl.

BOGEN (Berlin)

362. HELLERICH, E., Untersuchungen über das unmittelbare Behalten von Taubstummen. *Zeit. f. päd. Psychol.,* 1921, **22**, 16–33.

Vergleicht die Ergebnisse aus zwei verschiedenen Versuchsreihenfür das optische unmittelbare Behalten graphisch dargebotener Zahlzeichenund entsprechender sehend aufgefasster Lautgebärden. Versuchspersonen im Alter von 8–13 Jahren. Die Ergebnisse widersprechen der Erwartung, dass graphische Zeichen einprägsamer und daher dauerhafter zu behaltensind als vom Munde abgelesene Lautgebärden. Die Erklärung liegt in der durch die Unterrichtsmethode der Taubstummenschule bedingten Übung im Ablesen von Gebärden. Die Durchschnittswerte für Zahlzeichen sind beim energischen Willenstypus, die für Lautgebärden beim willensschwachen höher. Bei ihm geht auch die Person des Versuchsleiters als beachtlicher Faktor in die Leistung ein.

BOGEN (Berlin)

363. HUTH, A., Grundsätzliches über Personalbogen. *Zeits. f. päd. Psychol.,* 1921, **22**, 117–125.

Genaue schriftlich festgelegte Einbelbeobachtungen des Lehrers sind notwendig, um ihm ein klares Bild von der Individualität des Zöglings zu schaffen. Rein intuitiv erfasste Eigentümlichkeiten ermöglichen nur unbestimmte Urteile. Diese Erkenntnis führt zur Anlage von Personalbogen. Ihre Anwendung beschränkt sich noch grösstenteils auf Schüler, die in andere Schulgattungen übergehen, weil die Fülle der vorgedruckten Fragen und damit die Masse der Arbeit schreckt Zu fordern ist, für alle Schüler Personalbogen anzulegen zum Nutzen der eigenen Erziehungsarbeit, als Anhalt für den Lehrnachfolger und den Berufsberater. Für möglichste Beschränkung der leitenden Gesichtspunkte der Bogen wird eingetreten.

BOGEN (Berlin)

364. v. ZABUESNIG, K., Eine Untersuchung von Schulneulingen. *Zeit. f. päd. Psychol.,* 1921, **22**, 125–131.

Grundlage ist das vom Leipziger Institut für experimentelle Psychologie und Pädagogik herausgegebenen Material zur Untersuchung von Schnulneulingen. Sie erstreckt sich auf Anpasssungsfähigkeit, Geschicklichkeit, Vortellungsleben, erworbene Fähigkeiten und Fertigkeiten, Denken und Urteilen. Die Leistungen im Lösen praktischer Aufgaben, im Zählen und Zahlgestimmen stehen obean. Die Erklärung ist in der Heranziehung der Kinder zu

häuslichen Verrichtungen zu suchen. Auf besonders tiefer Stufe steht die Sprachbildung. Im Zeichnen sind ehemalige Kindergartenschüler den andern überlegen. Für die Verwendbarkeit der Versuchsanordnung spricht die hohe Korrelation für Intelligenzschätzung und Testrangordnung. (C=0,86.)

BOGEN (Berlin)

365. REMER, L., A Comparative Study of a Border Line Defective and a Normal Child of the Same Mental Age. *J. of Educ. Psychol.*, 1922, **13**, 160–169.

In this case there is presented "a concrete and fairly accurate indication of what may be expected educationally, from the typical 8-year-old having 6-year intelligence." Such a child was paired with a normal 6-year-old, the latter receiving regular school instruction in reading and the former receiving, in addition, three months of tutoring in reading. Visual, auditory, and kinaesthetic associations were employed and the last type were found most effective. The normal child learned words ten times as easily as the defective child. At the end of the tutoring period the defective child had a reading vocabulary of thirty-eight words, while the normal child was able to read in any of several second readers that he had not seen before. There was some improvement in the defective child's conduct during the training period, although this was expected not to be permanent. There was no change in the I. Q. during this period.

The writer concludes that the only place for this child is in an institution for the feeble-minded, where she cannot increase her kind and where she can be taught to do the type of thing that she enjoys most, namely, out-of-door work.

A. T. POFFENBERGER (Columbia)

366. LESTER, J. A., A Study of High School Spelling Material. *J. of Educ. Psychol.*, 1922, **13**, 65–74, and 152–159.

The objects of this investigation were: (1) To determine what words are most frequently misspelled by the graduates of high schools and preparatory schools. (2) To determine how these words are misspelled. (3) To determine how these words may be taught and learned with a minimum expenditure of time and energy on the part of teacher and student. Essays of 2414 students, written for the College Entrance Examination Board provided the material for study of errors which numbered 14,002. These errors were all concentrated in 2602 words. It is rather interesting that 100 of these words were responsible for over 30 per cent of all the errors,

and 500 words were responsible for over 64 per cent of all the errors. The words are classified according to their nature. The errors are also classified into twenty groups. The five largest classes of misspellings are: (1) Word compoundings. (2) Prefixes and suffixes. (3) Confusion of words similar in sound or appearance. (4) Mistakes traceable to mispronouncing. (5) Mistakes in the use of the apostrophe. About 25 per cent of the errors are misspellings of derivatives.

The most direct means of gaining economy and efficiency in teaching spelling are then considered. The most important of these seems to be to teach the child with regard to what he does not know, rather than on the basis of frequency of use in adult vocabularies. The material should then be presented so that the critical points where errors are likely to occur may receive necessary emphasis.

A. T. Poffenberger (Columbia)

367. Wallin, J. E. W., Intelligence Irregularity as Measured by Scattering in the Binet Scale. *J. of Educ. Psychol.*, 1922, **13**, 140–151.

The results of a number of the author's studies of scattering in the Binet tests are gathered together in this paper. Scattering, "the number of tests passed above the basal age," is shown in relation to the following: (1) Grade of Intelligence. After accounting for discrepancies due to the form of the test used (1908, 1911, Stanford) it is concluded that normal pupils scatter most and imbeciles least. There is no warrant for the assumption that scattering in intelligence is the specific characteristic of feeblemindedness. (2) Intelligence Age Level. The discrepancies in results obtained from different forms of the test make conclusions hazardous. "If we are justified in drawing any conclusions at all, it would be that the smallest amount of scattering occurs in the lowest mental age levels, and possibly that the largest amount tends to occur in the middle range of ages." (3) Neurotic, Psychopathic and Delinquent Types. "It is not yet certain whether scattering can be used as a pathognomonic sign of any type of mental defect, although our previous analyses seem to have shown that epileptic and psychotics as groups scatter more than any other groups." (4) Sex. The sex differences found are very slight and vary with the form of the test used. (5) Different Forms of the Test. Scattering is greatest with the Stanford and least with the 1908 form. Wallin speaks of the scattering as a "peculiarity or weakness of the Stanford scale."

A. T. Poffenberger (Columbia)

368. KNIGHT, F. B., Data on the True-False Test as a Device for College Examinations. *J. of Educ. Psychol.*, 1922, **13**, 75–80.

This report supplies data which will aid in determining the reliability of the True-False form of examination. One hundred and eighty-two students in physics were tested. The questions covered material studied in class, material not yet studied in class but known from high school study and from incidental learning. The following coefficients of correlation were found: Semester grades and test of material studied in class plus .45. The semester grades and material not studied in class plus .11. Semester grades and mixed material plus .39. Semester grades and written examination plus .65. Written examination and True-False examination plus .58.

As the True-False test took only about eleven minutes, the author believes a test could readily be constructed, covering a much wider range of material, which would show a higher correlation with grades than the written examination and which would be saving of the instructor's time.

A. T. POFFENBERGER (Columbia)

369. LINCOLN, E. A., Time Saving in the Stanford-Binet Test. *J. of Educ. Psychol.*, 1922, **13**, 94–97.

Several points in the technique of administering the Stanford-Binet test which aid materially in reducing the time and effort required are set forth in this paper. Groups of similar tests are arranged, as for instance, those requiring the repetition of digits, and the child is carried as far as he can go in one group before beginning another. The tests are classed into eight groups. Time is saved not only because directions need to be given less frequently but because "after one or two such groups have been given, it is usually possible to place the subject very accurately on the scale, and thus save time by determining at the outset the upper and lower limits beyond which he is not likely to go." Time is saved also in getting into the good graces of the child by beginning with the picture tests in which nearly every child is interested. The use of the tests in this fashion undoubtedly calls for greater skill on the part of the examiner.

A. T. POFFENBERGER (Columbia)

370. BEATTY, W. W., Judging Handwriting. *J. of Educ. Psychol.*, 1922, **13**, 170–172.

Three handwriting scales were compared, the Ayres scale, the Starch scale and the Thorndike scale. The paper deals especially

with certain weaknesses discovered in the last of these scales. The trouble with the Thorndike scale seems to be at point ten, where only one sample is given and that representing a rather odd style of writing. The author prefers the Ayres scale "for convenience, reliability and all round practicability."

A. T. POFFENBERGER (Columbia)

371. BARTON, J. W., Smaller vs. Larger Units in Learning to Typewrite. *J. of Educ. Psychol.*, 1921, **12**, 465–474.

An attempt is made to apply the "larger units" method of instruction to typewriting in somewhat the same manner as it has been applied in reading instruction. An examination of typewriting textbooks showed that the alphabet system of learning prevailed in typewriting methods. Applying the principle that "one should always begin by doing a thing as nearly as possible in the way it is eventually to be done," the author taught typewriting by having the students compose business letters at the very beginning of their training. A comparison of the results of this method with that of the "smaller unit" or alphabet method showed surprising superiority of the former in speed, accuracy and time required to learn. Here, as in most cases where such methods are tried, the factor of discouragement in the earlier stages of learning was encountered. It is this discouragement which is, no doubt, responsible for the continued use of the "piecemeal" method of instruction in most of our work of teaching and learning. Considering the great economy of the "larger unit" method, it would seem that teachers' energies could well be directed toward furnishing the necessary encouragement to the beginner.

A. T. POFFENBERGER (Columbia)

372. ROBACK, A. A., Subjective Tests vs. Objective Tests. *J. of Educ. Psychol.*, 1921, **12**, 439–444.

Roback makes interesting criticisms of the so-called objective tests (the True-False and Multiple Choice tests) just at the time when these devices so commonly used in intelligence tests are gaining in popularity as means of testing progress in college studies. To him these tests are objective only in the scoring, and it may be considered a questionable criterion of a good test that it saves the scorer's time and energy. Furthermore, "the superior adult not only misses the opportunity for manifesting his ability under such conditions, but his very originality and initiative in thought become a burden to him, when the courses are mapped out for him, with the

result that the mediocre person has the advantage over his intellectual superior." Other criticisms are: that the tests are artificial; that they do not measure such higher functions as interpretation, analysis, subtlety, etc.; that they have in them an indeterminate "guess factor"; and that they do not provide means for the study of individual differences.

A. T. Poffenberger (Columbia)

373. Comstock, C., and Kittredge, H., An Experimental Study of Children as Observers. *Amer. J. of Psychol.*, 1922, **33**, 161–177.

The tacit assumption that the child cannot describe his experiences, and that he cannot and should not be brought into a laboratory where the conditions of experiment can be controlled and repeated under exactly similar conditions with other children, has retarded the development of an experimental child-psychology. The experiments reported here were designed to test this assumption. Six children, ranging from 4 to 11 years in age, were used as observers, with two college girls for comparison. The experiments used were in the field of visual sensations: after images, adaptation, and contrast. They showed that children can give accurate and reliable descriptions of their experiences. The chief difficulties found were the use of language that children can understand, and the absolute necessity of framing instructions so as to avoid suggestion. There was no evidence that the children were "unnatural" in the laboratory; on the contrary, they took their surroundings for granted and the reports showed no traces of artificiality. The children showed more variability in their attitude and reports than did the adults, but this lack of stability decreased with training. The children, on the other hand, were more spontaneous in their reports, and tended much less toward interpretations.

G. J. Rich (Pittsburgh)

374. Watts, F., The Construction of Tests for the Discovery of Vocational Fitness. *J. of Applied Psychol.*, 1922, **5**, 240–252.

Successful construction of tests for the discovery of vocational fitness must depend in the long run upon an accurate psychological analysis of the various occupations. The fundamental assumptions underlying the methods of test-construction call for careful examination. One broad method of classifying the tests is into the divisions, analytic and synthetic. The synthetic tests may be further

divided into vocational miniature, empire tests, and analogous tests. The analytic test attempts to isolate and measure separately in respect of individual applicants for employment those physical and mental factors which are predominantly demanded in the given occupation. There are limitations to the usefulness of this method.

The type of psychological test is one which can be applied to those about to enter an industry with the idea of gauging their probable fitness in advance. The analogous test is the only satisfactory test which promises well from this point of view. This test method "calls both for a tentative psychological analysis of the work to be done and for the construction of problems calling out as a combination the essential capacities and interests concerned, in much the same proportion as they are demanded in the actual tasks, but in such a manner as to allow potential capacity, when necessary, to compete on equal terms with capacity already fully developed." The construction of these tests will be no simple matter, but is the only real way to progress.

E. Mulhall Achilles (Columbia)

375. Herrick, D. S., A Comparison of Brahman and Panchama Children in South India with each other and with American Children by means of the Goddard Form Board. *J. of Applied Psychol.*, 1922, **5**, 253–260.

In 1919 a series of tests was made with the Goddard Form Board in about twenty schools in the Madras Presidency. More than 700 children of ages from 4 to 14 were examined. Half of the tests were made on Brahman children and half on Panchama children—Panchama signifies in South India the very large social group in which are found the very lowest castes.

The Panchamas are from one to four seconds slower than the Brahmans at most ages. The results of Sylvester on American children are compared with the Brahman and Panchama children. At the age of 4 the American children are slower than the Brahmans, at 5 the Americans have caught up, at 6 the median for the Americans is 26 or seven seconds less than that of the Brahmans. Between 4 and 6 the Americans increased the speed of their performance twenty seconds while the Brahmans increased theirs only eight. The Americans maintain their lead through the other ages. The Panchamas show no increase in the speed of their performance after the age of 12 years.

The quickest time made by any Indian child was fourteen seconds, made by one 12-year-old Brahman, one 13-year-old Brahman, one

14-year-old Panchama child. The fastest time made by any American child, reported by Sylvester, is nine seconds and was made by children of 11, 13 and 14 years.

E. MULHALL ACHILLES (Columbia)

376. YEUNG, K. T., The Intelligence of Chinese Children in San Francisco and Vicinity. *J. of Applied Psychol.*, 1922, **5**, 267–274.

An attempt was made to discover the general intelligence level of Chinese children in the vicinity of San Francisco by means of the Stanford revision of the Binet tests. The test was given to sixty-two boys and forty-seven girls from 5 to 14 years. They were all American born. No striking differences in the intelligence of the Chinese and American children are indicated. The I. Q. for the Chinese group was 97 in comparison with 99 for a group of 905 American children studied by Terman. The groups of boys and girls were not equal—the median for the sixty-two boys was 93.5 and for the forty-seven girls 99.9. The Chinese of the vicinity of San Francisco belong chiefly to the lower levels of occupational status.

E. MULHALL ACHILLES (Columbia)

377. HEGGE, T. G., Zur Analyse des Lernens mit sinnvoller Verknüpfung. *Beiheft 29, Zeit. f. angew. Psychol.*, 1921, 158–171.

Geht den Ursachen der Leistungen der Gedächtniskünstlerin Frl. Bergh nach., die Hegge seit längerer Zeit eingehend untersucht hat. Dit Umgestaltung des Lernstoffs (Reihen von Wörtern) in pragmatische Komplexe und Reihungen mit festem Ortsbild setzt die hemmenden Wirkungen der Ähnlichkeiten im Lernstoff herab. Dauerndes Behalten wird durch die Verwendung verschiedener Ortsbilder für jede Reihe unterstützt. Die persönlichen Eigenschaften Frl. Bergs sind auch zur Erklärung heranzuziehen. Sie kann ungewöhnlich deutliche und inhaltreiche Vorstellungsbilder erzeugen, vermag sich in die Zustände lediglich vorgestellter Phantasiepersonen intensiv einzufühlen. Dramatische Situationen werden bis zu höchster Erregung miterlebt. Am stärksten werden die Leitsungen bedingt durch eine hochentwickelte Fähagkeit zur Bildung zweckmässiger Verknüpfungen.

H. BOGEN (Berlin)

378. RUPP, H., Grunsätzliches über Eignungsprüfungen. *Beiheft 29, Zeit. f. angew. Psychol.*, 1921, 32–62.

RUPP, H., Wie entwickelt man psychologische Eignungsprüfungen? *Der Betrieb*, 1921, **4**, 96–105.

Die praktischen Grundsätze für die Entwicklung einer Eignungsprüfung, wie sie Berufsanalyse, erste Auswahl, Untersuchung und Bewährung der Proben verlangen, werden eingehend dargelegt und besonders die von Laien in die Berufsforschung hineingetragenen unpsychologischen, unexakten Verfahren besprochen. Besonders ausführlich werden die individuellen Leistungsschwankungen und die Frage der Übung in ihrer Bedeutung erörtert. Die einzelne Tagesleistung ist kein zuverlässiges Mass der Fähigkeit. Je mehr Werte zu einem Mittel zusammengenommen werden, desto weniger schwankt das Mittel. Es bestätigt sich vielfach das Gesetz $1 = \frac{1}{\sqrt{n}}$ Die Leistungsschwankungen müssen kleiner sein als die individuellen Unterschiede. In Vorversuchen muss ein Bild der Übbarkeit der Leistung gewonnen werden. Es sind Proben zur Feststellung der Berufstüchtigkeit zu schaffen, die objektive Vergleiche ermöglichen.

H. BOGEN (Berlin)

379. HERWIG, B., Auswertungsverfahren bei nichtapparativen psychotechnischen Proben zur Eignungsfeststellung und ihre Bedeutung für die Methodik der Eignungsprüfungen. *Praktische Psychol.*, 1922, **3**, 114–126.

Zunächst werden die Vorzüge des Apparats gegenüber nichtapparativen Verhafen darzustellen versucht. Grundsätzlich und praktisch wird dann die Kombination von Zeit- und Fehlergrössen bei der Bewertung erörtert. Für Fälle, in denen eine hohe Korrelation zwischen Zeit und Güte der Leistung besteht und die Zeitmasse eine stärkere Differenzierung der Prüflinge ergeben als die Fehler, wird die Bewertung nach Zeit vorgeschlagen. Für die möglichen vorkommenden Fehler sind Zuschläge zum Zeitwert zu machen. Die Höhe des Prozentzuschlags ist abhängig von der Schwere der Fehler, die durch die Häufigkeit ihres Auftretens gegeben ist.

BOGEN (Berlin)

380. KOHNSTAMM, P., Über die Messung von Intensitäten und die Eichung von Tests. *Zeit. f. angew. Psychol.*, 1921, **19**, 263–290.

Es wird zunächst klargelegt, dass es den exakten Naturwissenschaften nicht möglich ist, alle physikalisch bedeutsamen Grössen im

absoluten Massystem einzuordnen. Eine weitere Grenze physikalischer Messungen liegt darin, dass Grössen, die durch mehrere nicht aufeinander zurückführbare Partialkomponenten bestimmt werden müssen, eine mehrdimensionale Mannigfaltigkeit bilden. Die so auch für die Physik gegebene Unterscheidung extensiver und intensiver Grössen und die "Messung" der letzteren geben der Psychologie das Recht zur Messung von Intensitäten, sodann aber auch die methodischen Grundlagen. Die schwierige Frage der Zuerteilung von Gewichten zu Partialresultaten bei ihrer Vereinigung zu einem Gesamtwert ist nicht "allgemein" und "objektiv" zu beantworten. Sie ist nur in Hinsicht auf einen ganz bestimmten Zweck zu geben. Nur für einen konstant gehaltenen Zweck ist ein konstant gehaltenes Bewertungsschema zugrunde legbar. Die unbedingt notwendige Testeichung hat das intuitiv erfasste Bewertungsschema dem Ziel der Untersuchung soweit als möglich anzugleichen. Der geeichte Test ist nur verwendbar zur Gruppeneinteilung von Menschen innerhalb bestimmter Grenzen, nicht aber für individuelle Fälle. Tests müssen auf mittlere Werte eingestellt sein. Sie dürfen in der Beurteilung von Personen niemals alleiniges Mittel sein. Die Methode der psychologischen Profile ist die einzig mögliche.

H. Bogen (Berlin)

381. Wilhelm, H., Beitrage zur Begabungspsychologie auf Grund des Lehrerurteils. *Zeits. f. angew. Psychol.*, 1922, **19**, 291–341.

Die Statistk geht vom Lehrerurteil aus, das in 1375 Antworten auf breitangelegte Fragebogen gegeben war. Die Begabung wird als anthropologisches und biologisches Merkmal nachgewiesen, das von der Gauss' schen Verteilungsfunktion in nur geringem Masse abweicht. Was der Lehrer "mittelbegabt" nennt (of average abilities), das deckt sich nicht mit der zahlenmässigen mittleren Begabung der Kinder. Es gibt mehr *schwachbegabte* als hochbegabte Kinder. (Verteilung in den Volksschulen etwa: 2, 20, 48, 22, 8%.) In einzelnen Fächern weichen ungefähr 7½% der Schüler stark voneinander ab. bei 7% findet sich starke Verschiedenheit von Begabung und Leistung. In den Unter- und Mittelklassen sind die Mädchen den Knaben an Begabung und Leistung überlegen, in den Oberklassen kehrt sich der Sachverhalt um. Der Lehrer trennt bei seinem Urteil Begabung und Leistung scharf, wobei unter Begabung allgemeine geistige Leistungsfähikeit verstanden Wird.

H. Bogen (Berlin)

382. Berliner, A., Die Weiderholung einer psychologischen Intelligenzuntersuchung einjähriger Pause. *Zeit. f. angew. Psychol.*, 1921, **19**, 399–401.

Prüflinge waren 40 Kinder eines Waisenhauses. Benutzt wurde die Stanford-Revision der Binet-Skala. Der Vergleich der beiden Prüfungen ergibt hohe Übereinstimmung. Die Gruppe hat sich in ihrer Gesamtheit nich geändert, wohl aber ist die Variabilität grösser geworden. Hierfür ist in erster Linie eine raschere Entwicklung der Intelligenteren und ein Zurücksinken der Unintelligenteren Erklärungsursache. Ein Einfluss des Milieus ist weder nachweisbar noch anzunehmen.

H. Bogen (Berlin)

383. Schüssler, H., Intelligenz und Musikalität. *Zeits. f. angew. Psychol.*, 1921, **19**, 401–402.

Sch. hat auf Grund einer statistischen Untersuchung die Behauptung aufgestellt, dass "die Unmusikalischen den Musikalischen gegenüber einem niederen Begabungstypus angehören." Er berichtet hier über eine vergleichende Experimentaluntersuchung an besonders befähigten Kindern (19). Das Ergebnis der statistischen Untersuchung wird nicht widerlegt. Unter den Kindern mit zweijährigem und grösseren Intelligenzvorsprung sind 67% gut Musikalische, unter den schwächeren nur 30%.

H. Bogen (Berlin)

384. Lipmann, O., Der Bereich der psychologischen Berufseignungsforschung. *Der Betrieb*, 1921, **4**, 93–95.

Aus der Tatsache, dass nicht alle Berufe eine spezifische Berufseignung fordern, ergibt sich die Aufgabe, die Berufe und Berufsarbeiten nach dem Grade der erforderlichen Eigenschaften in eine Reihe zu bringen und so festzustellen, welche Berufe in höherem und welche in geringerem Grade einer Auslese bedürfen. Die verschiedenen Ziele der Auslese sind letzten Endes identisch mit den Merkmalen eines "idealen" Betriebes. Hinsichtlich der psychologischen Berufsberatung erwächst die Aufgabe, die Menschen in eine Reihe nach den Graden der speziellen Berufseignung zu ordnen. Die Beratung hat den Nachdruck nicht auf den Durchschnitt (ohne besondere Neigung und Eignung), sondern auf die übrigbleibenden zu richten. Das Herausfinden dieser Sondertalente ist in erster Linie durch systematische psychologische Schülerbeobachtung zu sichern.

H. Bogen (Berlin)

385. STERN, E., Die Feststellung der psychischen Berufseignung und die Schule. *Zeits. f. angew. Psychol., Beiheft 26,* 1921, p. 153.

Eine methodologische Untersuchung über die Frage: mit welchen Mitteln kann die Schule ohne Mehrbelastung diagnostisch zutreffende Angaben über Berufsneigungen und Fähigkeiten des Schülers erzielen? Aus den eigenen Angaben des Schülers im freien Aufsatz und im Fragebogen lässt sich ein ziemlich eindeutiges Bild über Neigungen und Interessen gewinnen. Der Elternfragebogen erwies sich als belanglos. Der Beobachtungsbogen des Lehrers gibt bei sachgemässer Gestaltung ausreichend Aufschlüsse über die Fähigkeiten des Schülers, wie sich durch eine teilweise experimentelle Überprüfung nachweisen liess. Die so erhaltenen Angaben ergeben das Material für die positive Berufsberatung, während das Eignungsexperiment nur der negativen Berufsauslese zu dienen hat.

H. BOGEN (Berlin)

386. VALENTINER, T., Zur Auslese für die höheren Schulen. *Zeits. f.. angew. Psychol. Beiheft 28,* 1921, p. 102.

Die Differenzierung der Schüler nach ihrer Anlage und Leistung und die daraus sich ergebende Überleitung des Einzelnen in die ihm entsprechende Schulbahn fordert vom Lehrer systematische psychologische Beobachtung seiner Schüler. Hierfür stehen häusliche Verhältnisse, körperliche und seelische Gesundheit, Charakter, Aufmerksamkeit, Arbeitsart, Gedächtnis, Beobachtungsfähigkeit, Auffassung, Denken und Phantasie im Vordergrund. Das Buch gibt praktische Anleitung zum Beobachten. Zu diesem Zweck werden Schülertypen umrissen, wie sie dem praktischen Pädagogen vor Augen stehen, z.B. der Gleichgültige, der Träumer, der Ablenkbare, der leicht Ermüdbare, etc. Den Schluss bildet ein den Richtlinien des Verfassers entsprechender Beobachtungsbogen.

H. BOGEN (Berlin)

387. STERN, W., und WIEGMANN, O., Methodensammlung zur Intelligenzprüfung von Kindern und Jugendlichen. *Beiheft 20, Zeits. f. angew. Psychol.,* 2 Auf., 1922, p. 316.

Die Sammlung von Testmethoden erstrebt für das letzte Jahrzehnt Vollständigkeit. Von älteren Tests sind nur solche aufgenommen, die auch heute noch brauchbar und wertvoll erscheinen. Die gesammelten Tests beziehen sich auf die Intelligenz, d.h. die geistige Anpassungsfähigkeit an neuartige Anforderungen. Prüfungsmittel für andereseelische Funktionen sind nur in soweit aufgenommen,

als sie als formale oder materiale Bedingungen der Intelligenz angesehen werden müssen. Bei jedem Test sind Anmerkungen über Herkunft, Alterseichung und Prüfverfahren gegeben, z.T. auch über Verrechnungsmethoden und Ergebnisse. Die Bibliographie umfasst 138 Nummern.

H. Bogen (Berlin)

388. Peter, R., und Stern, W., Die Auslese Befähigter Volksschüler in Hamburg. Hamburger Arbeiten zur Begabungsforschung Nr. 1. *Beiheft* 18, *Zeits. f. angew. Psychol.*, 2 Auf., 1922, p. 161.

Bericht über das ausgedehnteste Schülerausleseverfahren in Deutschland. Die weitestgehende Kombination von Lehrerurteil und psychologischer Prüfung ist hier durchgeführt. Die Testreihe ist im wesentlichen eingestellt aif eine Feststellung der Höhenlage schulisch besonders wichtig erscheinender psychischer Fähigkeiten. Dabei ist der für den vorliegenden Fall besonders wichtigen Erkennung der sprachlichen Begabung Rechnung getragen. Fur die einzelne Prüfleistung wird eine Zeugnisnote erteilt, die eine Kombination von exaktem Rechenverfahren und intuitivem Urteil darstellt. Den Schluss der Arbeit bildet ein Ausführlicher Bericht über die Bewährung der Ausgelesenen in der Schule, die nach einem besonderen Verfahren festgestellt wurde.

H. Bogen (Berlin)

389. Weber, J., Zur Organisation der psychologischen Praxis in Schule und Beruf. *Psychol. Mitteilungen*, 1920, **1**, 121–124.

Die Schule hat durch fortgesetzte psychologische Beobachtung und regelmässig zu wiederholende psychologische Prüfungen eine gewisse Berufsvorauslese und -vorberatung zu pflegen. Die besondere Berufsauslese zu Tätigkeiten von individueller Art und Bedeutung fällt der Praxis und dem Berufsamt zu. Charakteristische Abschnitte liegen im 10. Lebensjahr (Zulassung vorausgelesener Schüler in eine höhere Schulart), im 14. Jahre (Zuteilung zur allgemeinen Berufsgruppe oder Auswahl für besondere höhere Schulart), nach dem 16. Lebensjahr (Eignungsfeststellung für besondere Berufszweige, in der höheren Schule weitere Differenzierung nach individueller Veranlagung.

H. Bogen (Berlin)

390. Lipmann, O., Psychologische Schülerbeobachtung zur Vorbereitung der Berufsberatung. *Psychol. Mitteilungen,* 1920, **1**, 124–127.

Eine aus dem Institut für Berufs- und Wirtschaftspsychologie hervorgegangene Beobachtungsanweisung. Jeder Schüler ist vom Schuleintritt an zu beobachten. Die Beobachtung soll sich auf alle diejenigen Fälle erstrecken, in denen ein Schüler eine wichtig erscheinende psychische Eigenschaft (ihren Besitz, ihren Nichtbesitz oder ihren Grad) deutlich bekundet. Beobachtungsgelegenheiten sollen nicht absichtlich herbeigeführt werden. Den Fragen nach allgemein berufswichtigen Eigenschaften schliesst sich eine Fragenreihe an, die den Beobachtenden zu Urteilen über die mutmassliche Eignung des Beobachteten auffordert. Z. B. Besitzt der Schüler mehr Eignung und Neigung für Umgang mit Personen, mit Sachen oder für rein gedankliche Betätigung? Oder: für präzise oder für frei gestaltende Arbeit, etc.

H. Bogen (Berlin)

391. Weber, J., Der psychologische Beobachtungsbogen nach Inhalt und Form. *Psychol. Mitteilungen,* 1921, **2**, 1–4; 13–17; 29–33.

Der Beobachtungsbogen muss sich von der fachpsychologischen Einstellung befreien. Für seine Anordnung und Fragestellung ist der Ablauf der zu leistenden Arbeit leitender Gedanke. Er muss Auskunft geben über Personalien, Abstammung, wirt schaftliche und soziale Verhältnisse, körperliche Entwicklung, vorhandene Bewusstseinseigenschaften, Arbeitwillen, Arbeittechnik, Stellung zur Umgebung. Er muss ferner die Möglichkeit zu einem zusammenfassenden Gutachten und zur Umschreibung des Gesamteindrucks der Persönlichkeit geben, die wiederum zu einer gutachtlichen Äusserung über die Berufswahl führen. Nach Ratschlägen für die Praxis der Beobachtung ist ein den Forderungen entsprechender Entwurf abgedruckt.

H. Bogen (Berlin)

392. Schoenebeck, E., Grundsätzliches über psychologische Beobachtung und Beurteilung. *Psychol. Mitteilungen,* 1921, **2**, 37–47.

"Aufgabe der Schule ist es, nicht (wie im Laboratorim) zu experimentieren, sondern bei allen sich von selbst spontan und triebartig bietenden, nicht aber künstlich herbeigeführten Gelegenheiten die Seele des Kindes zu belauschen. Die Gegenstände der Beo-

bachtung sind neben den intellektuellen Fähigkeiten besonders Charaktereigenschaften, Willens- und Gefühlsleben, besondere Interessenrichtungen und Begabungen und das rasche Begreifen des Wesentlichen." Die Haupteigenschaften des Beobachters sind Totalität, Menschenkenntnis, Einfühlungsgabe, klare Beogachtung, Freundlichkeit, Güte und Geduld.

H. Bogen (Berlin)

393. Bobertag, O., Eine Versuchsschule als jugendkundliche Forschungsstätte. *Psychol. Mitteilungen,* 1921, **2**, 73–79.

Die Ursache für die noch immer zu geringe Beachtung der exakten Jugendkunde liegt darin, dass ihre Ergebnisse zum grossen Teil anfechtbar sind. Dieser Umstand ist aus den ungünstigen Bedingungen unter denen die Forschung arbeiten musste, zu erklären. Durch eigens auf jugenkindliche Forschung mit eingestellte Versuchsschulen sind günstige Bedingungen zu schaffen. Arbeitprobleme stellen Schuleintritt, Begabungsdifferenzierung, geistiges Wachstum, charakterologische Beobachtungen, Berufswahl, freies kindliches Schaffen und anderes dar. Wesentlich ist in der Fülle der Probleme zweierlei: Gewinnung von Ergebnissen, die ein sicheres und klares Bild von der Entwicklung und dem Fortschritt der einzelnen Fähigkeiten im Lauf der Jahre geben, und die Bewährung der Ergebnisse durch den Vergleich mit den anderweitig gewonnenen Angaben über die Versuchspersonen.

H. Bogen (Berlin)

12. MENTAL EVOLUTION

394. Maillard, J., Acute Sense of Sound Location in Birds. *Science,* 1922, **55**, 207–208.

G. J. Rich (Pittsburgh)

NOTES AND NEWS

Dr. C. S. Myers has resigned from the directorship of the psychological laboratory of the University of Cambridge in order to devote his whole time to the work of the British National Institute of Industrial Psychology.

At the meeting of the National Academy of Sciences, held in Washington on April 26, Professor C. E. Seashore of the State University of Iowa was elected a member.

The Publication of the *Behavior Monographs* will be discontinued upon the completion of the current volume (Volume 4) and a new series of *Comparative Psychology Monographs* will be initiated under the editorship of Professor W. S. Hunter, of the University of Kansas, with the coöperation of Professors H. A. Carr of the University of Chicago; S. J. Holmes of the University of California; K. S. Lashley of the University of Minnesota, and R. M. Yerkes of the National Research Council. The new monograph series will be broader in scope than the old and, in addition to studies in animal behavior, will publish work in human psychology conducted from the comparative point of view.

Dr. C. E. Ferree, of Bryn Mawr College, has been appointed one of an international commission of four for the standardization of the work on field taking, to report to the Thirteenth International Congress of Ophthalmology to be held in London in 1925.

Professor E. B. Titchener, of Cornell University, delivered a lecture on "The Structure of the Physiological Psychology" on April 8 before an open meeting of the William James Club of Wesleyan University.

At the recent meeting of the Michigan Academy of Sciences, Dr. J. McKeen Cattell gave the evening lecture under the auspices of the University of Michigan, his subject being "The Uses of Psychology".

The Morison lectures before the Royal College of Physicians of Edinburgh were delivered by Professor G. Elliot Smith on May 1, 3 and 5, the subject being "The Evolution of the Human Intellect".

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THE

PSYCHOLOGICAL BULLETIN

THE PSYCHOLOGY OF TASTE AND SMELL STATUS OF 1922

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Since the October of 1915 when Hans Henning published in the *Zeits. f. Psychol.* the first instalment of his work on smell (*Der Geruch*), the psychology of taste and odor has altered almost as much as the map of Europe has changed within the same period. Perhaps, also like conditions in Europe, it has not yet come to a stable equilibrium. To know Henning's work, one might almost say, is to know the psychology of these overlapping fields, for not only is he responsible for the revolution in doctrine, but he has also compiled the most encyclopedic bibliographies which were ever made on these subjects. The student who wishes to orient himself in the psychology, physiology, chemistry, or biology of taste and smell should first read Henning's monograph, *Der Geruch* (1), with its appendix on the taste qualities and its critical survey of earlier work. He should then read Henning's *Physiologie und Psychologie des Geruchs* (2) in the *Ergebnisse der Physiologie* for 1919, and finally his *Physiologie und Psychologie des Geschmacks* (3) in the same *Ergebnisse* for 1921, and should examine the enormous bibliographies to both papers. These bibliographies are supposed to cover the periods from 1902 and 1903, respectively, but, as a matter of fact, they include many earlier investigations. The student, however, who wishes to hunt up the *Ergebnisse* for 1902 and 1903 will find summaries of work on smell and taste by Zwaardemaker, with bibliographies to date. A few investigations covered by these earlier bibliographies are omitted by Henning. The present writer, lacking Henning's enormous library facilities, has not been able to find any

very recent publications of importance to add to the lists of Henning. It therefore seems best to devote the greater part of this report to summarizing the destructive and the constructive work of Henning for the benefit of readers whose interests lie mainly in other fields.

The Qualities of Taste and Smell. In 1915 most of us were teaching our classes that the qualities of smell were an unmapped wilderness as compared with the orderliness of colors and tones. Whereas colors constitute a tridimensional manifold of definitely related terms, smells, we said, are a manifold of indefinitely related terms. Tastes, we believed, were only four in number—apart from fusions. But in 1915 and 1916, Henning gave, or tried to give, us the smell prism and the taste tetrahedron to add to the color pyramid which we now beat into the head of the undergraduate as the canons of the syllogism were beaten into the head of his grandfather.

Let us first consider the question of smell qualities. After the publication of Zwaardemaker's *Physiologie des Geruchs* in 1895, his classification of odors was incorporated, as more or less satisfactory, into most textbooks which dealt with smell in any detail. This classification aims to be a "natural" one, that is, to include in the same groups and subgroups odors which show a mutual resemblance to one another. (See p. 215 of the *Physiologie.*) It is true that the scheme is an adaptation of the classifications of Linnæus and also that for the assignment of smells to classes authority is sought chiefly in the literature of the perfume industry; but it is not true, as Henning alleges (misinterpreting a statement of Zwaardemaker on p. 238) that Zwaardemaker disregarded sensory resemblances. Henning's own classification, however, has a great superiority over Zwaardemaker's in the fact that it is based on the direct experimental examination and comparison of a large number of odors by trained observers. Of this evidence something more will presently be said. Whether or not it is adequate to establishing the complete validity of the smell prism, it effectually overturns Zwaardemaker's scheme, which attempts to arrange, not individual smells, to be sure, but groups and subgroups of odors in a one-dimensional fashion, with fruity odors at one end of the series and fecal odors at the other. Henning, by showing clearly that there are criss-cross transitions between smells of six different types, has demonstrated once for all that *smells, like colors, constitute a tridimensional manifold.* This, in the writer's opinion, is the most noteworthy of Henning's important contributions to the psychology of smell. His prism has become so well known that the writer hesitates to describe it again, yet a

brief reminder to the reader is necessary to give definiteness to this summary. The prism is rooted (1) in the conclusion that smells belong to six main classes and (2) in the view that each of these classes merges more or less directly into every other class through a series of transitional smells. The six classes are the flowery, typified by violet; the fruity, typified by lemon; the spicy, typified by nutmeg; the resinous, typified fairly well by frankincense; the putrid, typified by sulphuretted hydrogen; and the burning, typified by tar. The two triangular faces of the prism are to be made equilateral, whereas the rectangular faces are to be squares. At the six corners of the figure stand, respectively, the most typical smells of the six classes. At the corners of one triangle should stand the typical flowery, fruity, and putrid smells; at those of the other, the typical spicy, resinous, and burning smells. It should be noted that the typical flowery smell is connected with the resinous and the burning, the fruity smell with the spicy and the burning, and the putrid smell with the spicy and the resinous, not by edges of the prism but only by diagonal lines across the square faces. This means that one cannot pass from one member of the pair—say, flowery and resinous—to the other without cutting the series of smells connecting another pair—say, fruity and spicy. At the junction of the diagonals we must, therefore, have smells equally like those at the four corners of the square. These smells Henning believes he has found. The smell of arbor vitae, for example, occupies a central position between the flowery, fruity, spicy and resinous types of odor. Examples of the transitional smells which should stand on the edges of the prism are as follows: Geranium, between flowery and fruity; decaying fruit, between fruity and putrid; the fragrant gums, between spicy and resinous;* vanilla and thyme, between flowery and fruity; the piney smells, between fruity and resinous (camphor, so closely akin to the pines, standing very near the resinous corner); and, finally, the ammoniacal animal odors, between putrid and burning. Odors like garlic are made transitional between spicy and putrid, the mints between fruity and spicy, and the smell of fish-scales between putrid and resinous.

Before discussing the smell prism farther, let us turn to its mate, the taste tetrahedron. Since the earlier work done by von Kiesow

* By an unfortunate slip of the pen, the writer in reviewing *Der Geruch* for the *Amer. J.* (4) reported Henning as placing the fragrant gums, which are obviously somewhat spicy, between resinous and flowery. As a matter of fact, Henning could find no smell transitional between flowery and resinous which did not have either a distinctly fruity or spicy aspect. See p. 298 f.

in the nineties, the orthodox view in regard to the taste qualities has been that they were four in number, and that all tastes other than pure sweet, salt, sour and bitter were mixtures. Henning, however, asserts that the taste of baking soda is no more nor less a blend of salt and sour than the color orange is a blend of red and yellow. This taste has two aspects (*Seiten* or *Aenlichkeiten*), a salty aspect and a sour aspect, just as orange resembles both red and yellow, but one no more tastes true salt and sour at the same time in tasting soda than one sees red and yellow simultaneously when one looks at orange. Thus sugar of lead has also a sweet and a sour aspect, and so on. Just as orange is a unity with an individuality of its own, so the tastes of soda and sugar of lead are unities. To illustrate the interrelations of the tastes, Henning draws his equiangular and equilateral tetrahedron. Its angles are, of course, occupied by the pure and typical sweet, salt, sour and bitter tastes. As already indicated, the taste of bicarbonate of sodium would stand on the line connecting salt and sour, and that of acetate of lead on the line from sweet to sour. The typical alkaline taste would stand between sweet and salt. Between sweet and bitter would stand acetone, between salt and bitter bromide of potassium and chloride of magnesium, and between sour and bitter, sulphate of potassium.

We are now in a position to discuss the prism and the tetrahedron together. These figures resemble the color pyramid in the relation to one another of the qualities which stand at the angles. Like red, yellow or white, the most typical spicy smell—say, nutmeg—and the taste of pure cane sugar are qualities with "only one aspect," whereas each quality in the series which they begin or end has two aspects. As yellow closes the series of orange hues and begins the series of yellow-greens, so nutmeg closes the series in which gum benzoin occurs and begins the series in which vanilla and thyme occur. But the prism and the tetrahedron differ from the pyramid in several important ways. (1) They have an entirely empirical basis, whereas the pyramid is based upon a fact reached only through a high degree of abstraction from crude sensory data but a fact almost self-evident when once discerned, namely, that colors differ among themselves in just three ways, hue, chroma and light-tone or "tint." Thus, it may turn out that there are more than six types of smell, whereas colors cannot well differ from one another in any fourth way. (2) Only the surface of the prism and the tetrahedron are at all comparable to the pyramid; the space within the figures must be abandoned to mixtures of the simple qualities which stand

upon the surface, and if we attempt definitely to locate these mixtures we are geometrically wrecked. (3) The qualities on the edges of the prism and tetrahedron, as Henning strongly emphasizes, are related to one another not like the colors on the edges of the pyramid, but rather like tones in the scale. No simple smell or taste quality, according to Henning (whose view the writer accepts), can be produced by mixing any two others, as—abstracting from the inevitable loss of saturation—we say that we can produce orange by mixing yellow and red. (4) The smells or tastes at the ends of one of the edges differ no more from each other than do the qualities in the middle of adjoining edges. Nutmeg and lemon, for example, differ no more than do vanilla and geranium, whereas red and yellow are more decidedly different than are orange and yellow-green. These last two points bring us to Henning's conclusions with regard to the mixture of smells and tastes, but before we enter upon this topic we should note the evidence for his classification of smells.

Henning made individual experiments upon fourteen adults and five children, and group experiments upon forty-six university students. He also served himself as an observer. Of the fourteen chief subjects (including himself) four were professional psychologists, two more were trained psychologists, and only four had never studied psychology. Two of the professional psychologists had no mean knowledge of chemistry. These were Henning himself and Professor Cornelius, who was especially familiar with odorous substances. Another subject also had studied chemistry and still another had worked in a clinical laboratory. Henning's material consisted of 415 scents of a relatively natural sort—such as essential oils, dried herbs, and the like, of fifty-one artificial perfumes or other trade-articles, and of the uncontrolled smells of daily life, which he caused his subjects systematically to examine. Many of his scents he used in several different concentrations. He made at least some use of six different forms of olfactometer, including Zwaardemaker's, for which he has very little use, but in general he seems to have employed simple scent bottles. His classification experiments were of two sorts. In the first, the subjects were merely required to describe carefully the character of scents presented to them. Their eyes were closed and usually the scents were not identified for them. Upon their descriptions and their confusions of one smell with another, Henning's classification is chiefly based. In the second set of experiments the subjects were given a number of scents and were required to arrange the bottles in series. Of

further details with regard to his method Henning gives exceedingly few. Moreover, he reports only a small part of his results in systematic fashion. His method is rather to make an assertion and then to illustrate it more or less fully from the reports of his observers. But such an elaborate construction as Henning's prism demands elaborate evidence. The present writer is convinced that smells can be ordered only on a three-dimensional scheme, and that a great part of Henning's classification must commend itself to any one who has worked much with scents. The writer is also captivated with the taste tetrahedron. The prism, however, falls short of carrying full conviction.

As regards *method* Henning has made two important points. One is that smelling with one nostril only is unnatural and gives a weak and vague impression of a scent. Hence, the mixture of odors should not be studied chiefly by smelling one with one nostril and one with the other. The other point is the advantage of making the subject describe a scent in ignorance of its nature. The true odor (*Gegebenheitsgeruch*) is localized in the nose and is obtained only by the subject who smells with closed eyes and does not know the nature of the scent. The object-smell (*Gegenstandsgeruch*), on the other hand, is, like color, projected upon the object to which it belongs and is distorted by associative supplementation. The possible distortion of smell experiences by the "residua" of earlier impressions is a point which Henning (5) stresses.

The Mixture of Smells and Tastes. Upon this topic also Henning's teaching is revolutionary. Before his work appeared most of us believed that the phenomena of smell mixture were somewhat parallel to those of color mixture. We believed that if two smells would mix at all, they would make a true blend like the blending of red and yellow into orange. We thought that if two smells would not blend, then the stronger would suppress the weaker; or, if the intensities were equal, we might have either rivalry or else compensation—that is, the suppression of the two smells each by the other. In compensation we believed largely on the authority of Zwaardemaker and Titchener. Some of us had failed consistently in our efforts to get it and von Kiesow and Passy had denied it. But on the authority of the perfume industry at large we believed that many odors could be exactly reproduced by blending other odors. Now Henning's teaching is as follows: (1) The odor of no simple substance (that is, of a substance whose *molecules* are all alike) can be reproduced by blending other odors. It is only by courtesy that

we can, for instance, say that natural and artificial musk have the same odor. But, (2) some smells do make unitary and stable blends or "combination-smells," analogous to orange as a blend of red and yellow. For example, the smell of oil of juniper is a blend, but so unitary is it that Henning allows it to stand on the flowery-fruity-resinous-spicy face of the prism. (3) Other smells either will not blend at all, or will blend only for a moment. Such smells may make loose, chord-like fusions. Subvarieties of these loose fusions are (a) the "coincidence" phenomenon in which by a strain of attention two odors are made to stand out separately, although they possess a certain unity; (b) the "succession" phenomenon in which, one after another, by a shift of attention, each component is made to stand out on the background of the rest; and (c) the "duality" phenomenon in which one of the two odors in a mixture is localized in the right nostril and the other in the left. (4) Some odors will not fuse at all. In this case we may have either rivalry or the suppression of one odor by the other. (5) Odors *never cancel one another.* Henning seems to become enraged every time he discusses compensation, and he is never a diffident critic. Zwaardemaker, he says, made only a few compensation experiments and his own pupils failed to verify his results. He worked with very weak stimuli, so that the phenomenon of liminal fluctuation cannot be ruled out of account. (This phenomenon is more evident with a mixed than with a simple stimulus.) Moreover, a momentary absence of odor could very well be accounted for on the supposition that all the free scent particles in an olfactometer of the Zwaardemaker type are for the moment exhausted. Henning says that he himself experimented on forty-six university students with this olfactometer and did not secure a single instance of compensation. (Here it should be noted that Zwaardemaker replies (6) that Henning did not follow the directions for the proper use of the apparatus.) The phenomenon never occurs in free air, says Henning, and if strong smells could cancel each other, then an apothecary's or a florist's shop or a menagerie would be odorless. The present writer must confess to being one of those persons who never can get a genuine compensation and is therefore strongly inclined to believe with Henning that some apparent instances are to be explained by the fluctuation of attention to a weak stimulus. (5) Smells are more likely to fuse closely, the more alike they are in quality and in feeling-tone, and the more used we are to encountering them together. (6) When smells fuse even loosely the likeness between them is evident

(*eindringlich*) rather than the difference, and even in a true blend we do not get a new smell but one which is like its components.

The phenomena of taste-mixture are almost exactly parallel to those of smell-mixture except that there are more numerous close fusions among tastes than among smells. Among taste mixtures also we find true blends, coincidence, succession, even duality if the stimuli are applied to different lingual areas, as well as rivalry and the suppression of one taste by another. The fusion of a smell with a taste depends upon our localizing them in the same area (as we do in eating) and on our being used to having them together. Thus, salt does not fuse readily with the flavor of wine, nor bitter with the odor of violets.

Taste Contrasts. On this subject Henning is not revolutionary but reaffirms the familiar findings of von Kiesow. He holds, however, that all four of the principal tastes contrast with one another, not excepting bitter (which von Kiesow ceased to except). Henning points out that if contrast is to occur between supra-liminal tastes, mixture must be warded off.

Putting together the facts of mixture and contrast, Henning holds that from the psychophysical point of view taste stands between color vision and smell, whereas smell stands between taste and tonal hearing. The four functions, perhaps, represent four stages in the development of sensory apparatus.

Exhaustion of Smell and Taste. Henning does not deny *Ermüdung* in the case of either smell or taste, but holds that in the former case it has been much exaggerated and much confused, not only with the lapsing of attention but also with narcotic and toxic effects, which he treats in pages well worth reading. It should be noted that *from the standpoint of Henning's views, Aronsohn's physiological method of classifying smells (the exhaustion method) is not worth an hour's practice.* For not only is genuine exhaustion hard to obtain, but specific energies corresponding to the smell qualities are incredible in view of the primitive structure of the peripheral organ of smell and of the homogeneity of its neurones. The physiological condition of the differentiation of odors and tastes lies, rather, in the different chemical reactions which substances of varying chemical constitution set up in the sensory epithelium.

The Chemistry of Smell and Taste. Henning constructs an elaborate basis in chemistry for his smell prism. He accepts the theory that smell is a constitutive property of the molecule, though he says that this does not prove that chemical elements are odorless.

As regards the "aromatics" of chemistry, he accepts the theory of Zwaardemaker and others that certain groups of atoms, the "osmophors," in the molecule have to do with odor, but points out that substances with different constitution as regards osmophors may smell alike. Three factors, he says, determine odor: (1) the presence of certain osmophors; (2) a kernel or radical for the molecule, to which the osmophors are attached (*an welcher sie sitzen*), which Henning calls the "osmogen" and which may consist of one or more atoms; and (3) the manner in which the omsophors are bound to the radical, that is, the positions they take in the benzol rings. In short, smell in the aromatics is largely a matter of molecular pattern. Henning finds patterns to correspond to each of his six classes of smells, and to the transitions between them. Tastes, also, in the case of organic substances are controlled by groups of atoms, though no one taste depends upon any one group. The group NO_2, for example, is characteristic of bitter substances, NH of sweet, and $COOH$ of sour. With regard to inorganic salts Henning points out that since each has a different taste, quality cannot depend simply on the presence of *anions* or *kations* but must depend upon some relation between the two—perhaps, as Herlitzka suggested, on a difference in solution pressure. Incidentally, it may be said that Henning agrees with Zwaardemaker (7) and disagrees with Teudt in believing that electrical effects have little to do with smell.

Among other matters with regard to taste and smell which Henning treats with full reference to the literature and with illuminating comments are *stimulus thresholds, reaction times, imagery, illusions and hallucinations, feeling-tone, the physiology of the organs, and smell and taste in animals.* His study of smell in ants, which forms the first appendix to his monograph, is a most noteworthy contribution to animal psychology. No space remains for a discussion of these topics here. For a clear, comprehensive and interesting survey of the psychology of taste the reader is recommended to Hollingworth and Poffenberger's little book (8). Unfortunately this book went to press just before Henning's work was known in this country. Whether one agrees with Henning or not, one must admit that any book on taste or smell which fails to reckon with him is somewhat out of date. Since, however, Henning's opinions on taste are not very revolutionary except with regard to the list and relations of simple tastes, Hollingworth and Poffenberger may congratulate

themselves that it was a book on taste and not one on smell that they published in 1917.

Incidentally it should be noted that Hennschen (9), on the basis of a series of examinations of the brains of persons with taste defects, has been led to believe that the cortical centre for taste is not in the horn of Ammon nor in the hippocampal gyrus. He is, however, not very certain even of this negative conclusion.

Finally a word should be said about Zwaardemaker's review of Henning's monograph. Zwaardemaker (6), in view of Henning's scathing and repeated criticisms, has treated the younger writer most magnanimously. He speaks cordially of Henning's psychological work and with appreciation of his wide knowledge of the literature in his field. The almost too marvellous correspondence between Henning's psychology and chemistry of smell, however, is pointed out. This chemistry Zwaardemaker declines for the time being to criticize. His severest criticism amounts to saying that Henning as a psychologist ought not so often to step out of his own field in order to criticize the work of physiologists, to whose technique he is not in a position to do justice.

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THE FLIGHT OF COLORS IN THE AFTER IMAGE OF A BRIGHT LIGHT

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It is well known that the after image of a very bright light presents the appearance of a series of color changes which persist for a longer or shorter time after the stimulus has been removed. The phenomena have received the name of *Farbiges Abklingen der Nachbilder* (Helmholtz). They have been more or less superficially noted from the time of Aristotle down to the modern period of Physiological Optics. Much of the literature of the subject is in German and French; there being comparatively few original articles in English. Almost all the texts in psychology and physiology refer to the phenomena, usually in most general terms, in the sections devoted to the visual sensations.

The purpose of this report is to review the literature of the subject and to present data drawn from this literature, which in many respects are very conflicting. It may seem to be a rather hopeless task to add anything new to the solution of a problem which interested a Fechner and a Seguin, or bring order out of such conflicting data. A review of the literature, however, suggests, in part at least, the reasons for the disparity between the results obtained. There are several problems which emerge from the review which seem to demand further experimental work.[1]

According to Aubert (6) the first person to make observations on the chromatic *Abklingen der Nachbilder* was Josephus Bonacursius. Aubert's reference is to Kircher's *Ars magna lucis et umbrae,* 1671. In point of fact there are several references to be found in the literature prior to this date. Aristotle reveals a very carefully made observation in the passage in *De Insomniis* (3) which has been translated as follows: "Again, if after having looked at the sun

[1] The writer has carried on a prolonged series of observations with a number of subjects on the flight of colors in the after image of a bright light. The results of these observations will be published later.

or some other bright object, we close the eyes, then, if we watch carefully, it appears in a right line with the direction of vision, at first with its own color, then it changes to crimson, next to purple, until it becomes black and disappears" (4). Following Aristotle almost everyone who wrote on the subject of optics made some sort of generalization on the phenomena and the features of the color transformation in the image. Almost all the observers used the sun as the primary stimulus and then with closed and covered eyes, or closed eyes, or with open eyes observed the shift of colors in the visual field. Plateau (49) has collected the references in the literature upon this and related topics in the field of subjective vision from the time of the Greeks down to the end of the 18th century. In connection with the subject of the color changes in the image, Plateau prefaces his annotated bibliography with some pertinent remarks on the danger to the eyesight in the investigation of the after image of blinding lights such as were used. "The experiments which are the object of this section are dangerous. They are of the sort which have developed in me the germ of an affection which has completely deprived me of vision. I cannot too strongly advise physicists and physiologists to abstain from the same experiments, which present but a slight importance compared with the ills which may arise."

Certainly the rash gazing at the strong light of the sun through a window or even directly in the broad light of day, which seems to have been the method of procedure of all these observers up till quite recent times could not be other than highly imprudent and fraught with evil consequences to the eyes of the unfortunate observer. Helmholtz and Fechner gave specific utterance to a similar warning. Unfortunately in the case of Fechner the warning was not heeded until it was almost too late to prevent unhappy consequences to his eyesight.

As this bibliography of the literature compiled by Plateau is not easily accessible to the average reader, I have availed myself of his work in the preparation of the following summary of the literature from the earliest period. For the most part the references are more or less casual statements without any attempt to elaborate the description or give specific details. This is true of many of the original sources from which Plateau obtained his material. I have, therefore, omitted from this account all but the mere statement of the sort of stimulus which was used in every case and the sequence of colors as it was reported in each case.

Summary of the reports made on the sequence of colors in the after image of a bright light, from the Greek period to the end of the 18th century.

Observer	Stimulus	Sequence of colors in the after image
Aristotle	Sun	Bright, crimson, purple, black.
Themistius	?	Red, purple, alternate, black.
Porta	Sun	Yellow, red, green, blue.
Michaelius	Sun	Bright, red, green, black.
Kircher	Sun	White, yellow, red, green, blue.
Bonacursius[1]	Sun	Yellow, red, purple, several other colors.
Zahn	Sun	White, yellow, red, green, blue.
De la Hire[2]	Sun	Red, yellow, green, blue.
Malebranche	Sun	White, yellow, blue, certain colors made by mixture, black.
Buffon	Sun	No specific sequence given.
Nollet	Sun	White, yellow, red, green, blue or violet, black (frequently the order is irregular).
De Bergen	Sun	Red, orange, yellow, green, blue, violet.
Porterfield	Sun	Red, yellow, green, blue, violet.
Haller	Sun	Yellow, green, blue, violet.
Aepinus[3]	Sun	
Scherffer	Candle flame	Natural color, with a black border, changes to bright red, green, then a mixture of green and dark blue, then the image appears black.
	White cloud	Dark blue, green, reddish orange, purple.
	White paper in sun's rays	Dark blue, green, orange, purple.
Mongez	Sun	Red, orange, yellow, green, blue, indigo, violet.
De Godart	White paper in the sunlight	Pale yellow, golden yellow, yellowish green, green, violet, blue, purple, reddish brown.
Venturi	Sun, candle flame, white paper in sun	White, yellow, red, indigo, blue, green.

[1] Plateau briefly notes the observations of Bonacursius in his review. As the volume of Kircher's *Ars magna lucis et umbrae* could not be found by the writer, the following account has been taken from Aubert (5): "Among other observations Josephus Bonacursius mentions this . . . In any place which is closed as completely as possible so that no light whatever may enter, leave an opening covered with paper on which you draw any figure, or preferably, silhouettes of things. Also let the opening be facing the sun so that it may be illuminated by the sun. Having arranged this, fix the eyes on the paper opening and gaze steadily for a considerable time till the retina of the eye has taken in the image completely. Then, having closed the window fix the eyes on a white paper, and lo, wonder to relate on the paper you will see as it were the rising dawn, yellow being generated first, then red, next purple and lastly all the colors of the rainbow and finally

During the following century there was extraordinary interest in the problems of subjective vision, and many investigations were carried on by physicists and physiologists. Laymen also contributed to the general fund of information, as is evidenced by the numerous articles to be found in the reports of learned societies, etc.

At the beginning of the century Thomas Young (70) delivered his *Lectures on Natural Philosophy.* He mentions the fact that the impression of light on the retina is in some degree permanent, but he is not sure whether the retina possesses this property merely as a sort of solar phosphorus, or by virtue of some peculiar organization. If an object is painfully bright it generally produces a "permanent" spot which continues to pass through various colors for some time without much regularity and then vanishes. "This may, however, be considered as a morbid effect."

R. W. Darwin (15), writing on "Ocular Spectra," remarks: "On looking for a time on the setting sun so as not greatly to fatigue the eyes, a yellow spectrum is seen when the eyes are closed and covered, which continues for some time and then alternately disappears and reappears." This yellow becomes blue when the eyes are opened.

Goethe (23) describes in some detail the color changes in the image derived from a piece of white paper held in strong sunlight.

after a long time, you will see the figure of the opening in inverted colors which at length degenerates into a beautiful azure color mixed with intense red."

[2] De la Hire's account of the phenomena is involved with the description of the effect of the mixture of the image with other colored objects. "Mais si l'on regarde des objets differemment colores, les taches paroissent de differentes couleurs par la comparison de celles qui les environment et par leur mélange avec celles, ce que l'on peut connoître facilement" (18).

[3] It appears that Aepinus (1) alternately opened and closed his eyes during the period of the after image. After fixating the sun for 15 secs. he observed the image as follows. These details are taken from Brewster (9). After fixating the sun and shutting the eye he perceived an irregular pale yellow image of the sun, greenish and surrounded by a faint red border. As soon as he opened his eyes and turned them towards a white ground, the image was brownish red and the border was sky blue. When he again opened his eyes the image of the sun became green and the border became red. On a white ground the image was redder than formerly and the border was a brighter blue. On closing the eyes again the image appeared green, approaching to sky-blue, and the border was red. With a white ground again the image was red and the border was blue, but the shades of these colors were different from the previous ones. At the end of four or five minutes, when the eye was shut the image was a fine sky-blue and the border a brilliant red. These changed, when the eyes were opened, to an image of brilliant red and a border of fine sky-blue. Aepinus observed that the image frequently disappeared and reappeared, and that it generally disappeared when he wished to examine it and reappeared when he was not prepared to observe it.

If one regards an object, colorless but dazzling, it makes a strong impression which is lasting, and the *Abklingen* is accompanied by color phenomena. After stimulating the retina by a piece of white paper and turning the eyes towards the darkest part of the room, he saw a "round image" which was colorless but bright in the middle, then somewhat yellowish with a purple edge. This lasted for some time until the purple encroached from the border and presently covered the whole image. Immediately the edge began to turn into blue and this in turn passed gradually inwards to the center, meanwhile the edge became dark and uncolored. Again the center changed by the involution of the edge, so that the entire image became dark and colorless. The image declined in size and intensity. Goethe observed the length of time the image persisted. He fixated for five seconds, then closed the shutter (the paper was illuminated by sunlight passing through a small hole in the window shutter) and found that after thirteen seconds the image was completely purple, after a period of twenty-nine seconds more it was blue, and after forty-eight seconds it appeared colorless. Opening and closing the eyes prolonged the image to about seven minutes.

Purkinje (53) obtained the flight of colors by gazing at the flame of a candle for some time. With eyes closed and covered with the hands, he noted a bright after image, which quickly disappeared and was followed by a bright red. This disappeared, leaving a dark space in the center, surrounded by a weak gray. This became brighter and contracted towards the middle, leaving a darker edge. The bright center faded and finally vanished, leaving only a grayish haze over the whole field. With a longer period of fixation he found the same sort of transformation but with a longer period of duration of the image. He generalizes on the result of his observations that on the average the time relations are in the proportion of one second of fixation to twenty seconds of duration (image).

Brewster (10) records the results of his own observations in connection with his discussion of the work of Aepinus. He modified the procedure of Aepinus in some respects. Having selected a very bright summer day he obtained by means of the concave speculum of a reflecting telescope a very brilliant image of the sun on the ground. He "tied up" his right eye and gazed with the left eye intently through a tube at the solar image. "When the retina was highly excited, I turned the left eye towards a white ground and alternately opening and closing the eye observed the following spectra."

Spectra with the eye open	Spectra with the eye closed
Pink surrounded by green	Green
Orange mixed with pink	Blue
Yellowish brown	Bluish pink
Yellow	
Pure red	Sky blue
Orange	Indigo

To Fechner (20) belongs the distinction of having made the first extensive series of observations on the color changes in the images of very bright lights. He remarks that the investigation of the *Abklingen der Farben* has been carried on hitherto in a rather superficial manner and for the most part with the dazzling images (*Blendungsbilder*) given by the sun or a flame. His own observations were extended over some time and frequently repeated. He calls attention to the possibility of individual differences in the details of the phenomena and the necessity of the coöperation of a number of observers.

For the production of after images Fechner used the following stimuli: (*a*) White clouds viewed through a circular opening in a dark room, the size of the opening being about 4.4 cm. in diameter; (*b*) white paper on black paper viewed in the direct sunlight; (*c*) white paper on a black ground illuminated by the sunlight focused on the white paper by means of a lens; (*d*) the sun, viewed directly, with a slightly cloudy, or very bright blue sky.

The duration of the exposure was a half to one minute long, and the images were observed with closed eyes covered with the hand. All the stimuli gave approximately the same results, with very minor differences, stimulus *d* and then stimulus *c* being most effective in the production of the most beautiful and enduring stages in the image. Fechner gave a very detailed analysis of the phases of the after image. The sequence of colors is, white (only with stimulus *d* and perhaps *c*), light blue, light green, dark red, dark blue. The first stages of the sequence pass more rapidly than the later. The phases are characterized by the color quality of the central part of the image, although there are other areas in the image which are distinguishable on account of difference of coloration. On account of the exceedingly fugitive character of the color transformations in the image, it was necessary to make very many observations on the separate areas of the image. He distinguishes

four such areas, '*Central,' Saum, Umring, Randschein.* These are, an inner disk; a border about the central disk not sharply separated from it; a more centrifugal border, rather sharply separated from the inner border by color differences and broader than the former; and farther out a more or less extended field of color or perhaps mere brightness. In general, the colors involute from the periphery to the center. A color will begin to develop in the periphery and pass toward the inner disk, finally overcoming it and occupying the whole of the central part. Meanwhile a new color may have begun to develop on the border in order to pass through the same course. Thus a succession of colors is being developed at the periphery, frequently the latest one is at the border before the preceding color has reached the center. The more intense the primary light, the more slowly do the sequence phases pass away. With a lesser degree of intensity of stimulating light the transformation from the light blue to the dark red is apt to be through bright reddish yellow rather than through green. The duration of the primary fixation does not seem to have an appreciable effect on the colors of the image.

In another place (20b) Fechner laid down the general rule that whenever the duration and the intensity of the stimulus has reached a certain degree, any increase either in intensity or of duration does not alter the constancy of the phenomena. The series is, white, blue green, red, and frequently blue. The stimulus was a white object on a black ground. During the first three phases the image is brighter than the *Grund des Auges,* but with red it becomes darker. There thus enters a stage where the complementary gains the superiority over the primary. Further, in the same article Fechner reports that the image of a piece of white paper upon a black ground in direct sunlight, viewed for a very brief time, showed blue, green (red-yellow) red, and again blue or blue-green. If the duration lasted merely for a "moment" the image was at first bright blue, violet, dull yellow or yellow-green; a series of colors never perceived after a longer duration.

Knochenhauer (34), following Fechner, became interested in the character of the after images of various kinds of light with open and closed eyes. Unfortunately it is almost impossible to find out from his account much information concerning these images. He used a variety of stimuli, *e.g.,* strips of white paper in broad daylight, the sun viewed directly or through clouds, reflected sunlight from mirrors, gold leaf in sunlight, etc. He had two main conditions, the image with eyes open and eyes shut. He made a distinction

between two kinds of after images. The first class is that where the images in both open, closed and covered eyes are complementary to the perceived object, and a second class where the images in both open and closed eyes are complementary to one another. The first class are called *Subjective Nachbilder,* and the second class are called *Blendungsbilder.* This distinction is valueless on the basis of the data he has given.

Müller (43) described the colored spectra from the impression of colorless objects. "If the eye, after viewing the sun, be exposed to perfect darkness, that is, if light be entirely excluded from it, the colors of the spectrum will succeed each other in the inverse order, namely, from white through the lightest, and then the darker colors, to black; thus, in the order of white, yellow, orange, red, violet, blue, and black." "These phenomena, which cannot be explained by any external conditions acting on the eye, are another proof that colors have their immediate cause in the conditions of the retina itself."

Brücke (11) asserted that the after image of the usual mixed light (white), when the light intensity is only moderately strong, is colorless, but with light of a greater intensity the image may be of a lively coloration. Thus, after looking at the sun, he had a bright green or bright blue image surrounded by a bright red or orange. Again, after looking on a white field directly illuminated by strong sunlight he obtained a green image which became blue, then violet, and finally deep red. All the colors were brighter than the ground. After the red had disappeared no new color came; the field remained black, darker than the background. According to Brücke a positive image is one in which the brightness relations in the after image are the same as they are in the object. Conversely, a negative image is one where the brightness relations are reversed. The positive image shows features which are not present in the negative. The color changes which have been called the *Abklingen der Farben* appear in his experience only with positive after images, but they do not appear with all positive after images. The color transformations are most clearly seen with stimulating lights which are most like white light. His explanation of this fact is as follows: "I suppose, therefore, that it is attributable to nothing other than that the positive images of the lights compounded together in the white light temporarily fall apart."

Seguin's contribution to the experimental literature is notable for his thoroughgoing and careful analysis of the details of the stages in the chromatic series. His reports, extending from 1851 to 1880,

are the result of very many observations carefully made and minutely recorded. He states that the after image of a white object is always colored, whether the illumination is strong or weak, and when the duration of fixation is for one or two seconds or up to the point of dazzling (60). Nevertheless, the character of the image changes with the brightness of the stimulus and the length of time of exposure. In general, the colors in the image are disposed in a central area and, around this, in the form of concentric zones. The progression of the colors is from the periphery to the center. (Le centre de l'image passe donc successivement par toutes les teintes qui s'étaient montrées d'abord plus ou moins distinctement à la périphérie.)

Seguin's analysis of the chromatic changes in the after image provides for two series which differ according to the nature of the "tints," their behavior, and the circumstances of their production. Thus, after viewing a very bright surface, the colors appear very brilliant and clear in the closed eyes. The succession is very rapid from green through blue to violet. This is the first series. Then the other colors appear, darker and moving with less rapidity from the circumference to the center of the image. This is the second series, which nevertheless is not complete in the case of a very short exposure. If the duration is prolonged over about twenty seconds, after the dazzling of the first few seconds, one is able to recognize the colors of the first series, either complete or reduced perhaps to two or even one color only. Then the image assumes a definite form and the colors appear very distinctly. The second series in this case reaches full development and includes yellow, orange, red, violet, blue and green. Seguin adds that when the duration of exposure is very short the series may comprise yellow and green only, or yellow, red and green, or again yellow, red, blue and green, thus approaching completion more or less, according to circumstances.

Whenever the brightness of the stimulus is of low degree the image presents the colors but in fewer number. The series then is blue and violet, then nuances of yellow or red, and finally green.

According to Seguin the first series and second series appear to conflict at the point in the image when the first gives place to the second. This is indicated by mixtures of the blue or violet of the first series with the yellow of the second. (Il y a une sorte de trouble dans la partie centrale de l'image des nuances indécises et mélangées, par exemple un mélange de bleu, de violet et de jaune; souvent une teinte blanchâtre, provenant peut-être de la superposition de ces dernières couleurs.)

In the case of a very powerful light such as that of the sun received in the full light of day, the colors of the image are very numerous. In addition to the positive series, including white, yellow, green, blue and violet, one is able to distinguish in the negative image two groups; one where the colors are "washed with white" and very transitory, the other less bright, although brilliant and persistent. The complete negative series includes, therefore, blue, green, yellow, orange, red, violet, blue, green, yellow, with a reddish zone (63).

Seguin describes the positive series of colors as follows: It includes yellow, green, blue and violet, and these colors are very fugitive, especially when the duration of contemplation (exposure) has been prolonged. They are "accentuated" when the stimulus is very intense. These, he adds, are the characters of the positive image of a colored object; we are thus led to regard the first series as the positive image of a white object. (Ces caracteres sont ceux de l'image positive d'un objet coloré: nous sommes ainsi conduit à considérer la première série comme l'image positive d'un objet blanc.)

Scoresby (57) reported to the Royal Society the results of an inquiry concerning optical spectra in respect to color in the images derived from the influence of light. Objects under low illumination do not ordinarily give chromatic images. Ordinary daylight and bright sunlight especially give spectra with remarkably vivid hues. It is asserted that some modifying factors of the chromatic spectra are differences in the intensity of the external light, the duration of the exposure and the condition of the retina at the time of exposure. Unfortunately there are very few data given to explain and support these generalizations. A low degree of daylight seems to have given an image with a dingy orange color, which became olive, yellow gray or bluish black and lasting only for a minute or less. Medium degrees of daylight produced an image with crimson pink, purple pink, violet, purple, indigo, blue. Still higher degrees of daylight gave different results, which were "far more uniform than those from inferior light." The series here was: Green, yellow-green, yellow, orange, red, scarlet, crimson and brown, or olive. "This series, it is observable, is particularly accordant in respect to the principal or fundamental colors with that of the prismatic spectrum from green to yellow, orange and red." Experiments (not described) showed that the photochromatic developments have some relation to the time of fixation, and the intensity of the light. "Thus the higher colors of the spectral series elicited by strong light

could, within certain limits, be also developed by more continuous gazing with inferior light: so that the pink colored spectrum derived from ten to twenty seconds gazing in low degrees of light could be elicited by a single glance under bright sunshine." A general proposition is stated to the effect "that we shall not be far wrong, perhaps, in considering the intensity of impression as the product of the time of gazing into the relative quantity of light admitted by the aperture."

Helmholtz (26) substantially agreed with Fechner and Seguin with regard to many of the details of the flight of colors. The series varies according to the duration and intensity of the primary impression. After a brief exposure the first white is very transitory and passes through greenish blue into a beautiful indigo blue and later into violet or "rosy" red. Then follows a dirty grayish orange, which marks the shift of the positive image into a negative image, and in the negative image the dirty orange frequently becomes a dirty yellow-green. With very short exposure of the primary light, the orange phase frequently marks the end of the image, which disappears before becoming negative. If one permits light to enter the eyes during the course of the flight of colors the general effect is to throw the image over towards the later stages of the flight, and the removal of the secondary light results then in a return of the image to the earlier stage. Thus, when the image is blue in 'absolute' darkness, if light is allowed to enter the eyes, the image shifts through reddish into a negative yellow image. If the eyes are covered quickly the image returns to blue. After a longer exposure and a more intense stimulus the image on a dark ground shows the following colors: White, blue, green, red, blue, and on a white ground, finally blue-green and yellow. The image becomes negative at the red phase. Helmholtz seems to find a difference in the behavior of the colors according as the image is of a moderately illuminated surface or of a dazzling object such as the sun. With the former images he noticed that color changes take place either over the whole surface or advance from this or that side in an irregular order. On the contrary, the color changes in the image of a dazzling object, *e.g.*, the sun, usually take place in a regular order, from the periphery towards the center (die Farbenänderungen des Bildes vom Rande nach der Mitte hin vorschreiten).

Fick (21) quoted the sequence of colors according to Helmholtz and gave an explanation of the phenomena in terms of Young's theory, and the "fatigue" hypothesis.

Aubert (5) refers to the images we are considering as *Blendungsbilder,* on account of the effect of the primary stimulus on the eye, which hinders the perception of objects of weak illumination. In this respect his use of the term is different from that of Knochenhauer. The *Blendungsbilder* arise only in the cases where the primary stimulus is very intense, as in the case of the sun or of a very bright flame. He points out that they have been obtained from lights of various kinds under different conditions of dark adaptation and with different degrees of brightness in the backgrounds. The number of variations in the image is extraordinarily large and it is impossible to obtain all the phenomena in a single observation. Aubert confirms Fechner's results as to the sequence of colors, with this exception, that between the light green and the negative red of Fechner's series Aubert found a yellow with a bluish edge, and after the negative red there is a positive yellow, which becomes white surrounded by a red field, which in turn is succeeded by an extraordinarily beautiful blue. The series of colors for Aubert is, therefore, as follows: White, light blue, light green, yellow, red, yellow, white, blue.

The same alternation between positive and negative images was noticed by Aubert, which had already been noticed by Fechner and Brücke. Aubert, however, asserts that with him the change from positive to negative was more frequent than was the case with Fechner. Aubert gives some details of the image in peripheral vision, which had barely been mentioned by Purkinje. The after image of the sun or a candle, obtained by looking at the light with rapid jerky movements of the eyes to one side, shows about twenty or thirty degrees from the center as a bright area (*glanzende Nachbild*); beyond that nothing at all appears. In his experiments with the electric spark Aubert was unable to find color in the after images, nor did he find color when the spark was seen peripherally through colored glasses.

Rollett (54) investigating the problem of subjective contrast in the after image, used colored glasses and also a white glass placed in the opening of a window shutter. He placed the glass so that it was surrounded by a dull, almost opaque, contrast surface. All experiments were made on very bright days between the hours of 9 A.M. and 2 P.M. He obtained dark adaptation by holding the hand before the eyes, and the exposure was made by rapidly withdrawing the hand and replacing it. The duration of the exposure was roughly timed by counting three from the beginning of the movement of the

hand away from the eyes to the return of the hand. The sequence of colors with the white transparent glass was greenish blue, violet (somewhat purplish), violet red, very pale pink, dull yellow, olive green. The phenomena were not essentially different when a "dull" white glass was used.

Hering did not pay much attention to the colored images of a bright light stimulus, evidently regarding them as insignificant. In the *Lehre vom Lichtsinne* (27) he mentioned the fact of their existence under certain conditions, where the color of the image and the *Lichthof* vary accordingly to the character of the light used, whether natural or artificial. Later on in the same work he remarked that the *Blendungsbilder* with the darkened eyes reveal the most beautiful saturated colors (27b). (Die dann im verdunkelten Augen erscheinenden Blendungsbilden zeigen bisweilen so gesättige schöne Farben, wie kaum das Sonnenspectrum). In his reply to v. Kries's criticism of his theory, Hering briefly notes v. Kries's remark, "that it is very difficult to understand how, according to Hering's theory, a colored *Abklingen* after stimulation with white light could take place" (35), and asserts that "most white lights are not 'neutrally white,' but have their color 'valency,' which is not apparent in ordinary vision. White light may be much mixed with color before it becomes perceptibly colored. Ordinary daylight has been shown to have color valency by Brücke and also by Hering" (28).

Harris (25) reported vivid after images of white paper illuminated by sunlight, the colors being rose pink followed by canary yellow. His explanation of the phenomena is in terms of Hering's theory.

Hodges (31) reports a number of observations which he made with the sun shining through a clear glass window and also through a slightly whitened window. With twenty seconds' fixation the image was colored a brilliant yellow green, dull orange, pink, rich crimson, dull purple and then blue. In a subsequent article (30) Hodges states the results of his observations in a series of propositions. Among other things he concluded that—

1. The color of the after image of a bright light is not in any way dependent on the color of the object, but upon the amount of light thrown on the retina, either by the amount in the light itself or by the amount of time during which one looks at it.

2. The succession of colors in the forming and waning of the image follows the order of the colors of the spectrum. Using white paper with ten seconds' exposure in sunlight he obtained with closed

and covered eyes an image in which the first color was blue, with fifteen seconds' exposure he obtained green, with twenty seconds yellow-green, and with twenty-five or thirty seconds the image was a vivid yellow-green or pure yellow. Increasing the duration of the exposure did not produce further changes. The order of disappearance seems to have been constant for Hodges and was always orange, crimson, violet, blue.

Cattell and Farrand (13) had seventy-five students tested for ability to see after images. Among other facts, the authors report the disappearance and reappearance of the images (oscillations). Cattell (14) described a remarkable case of prolonged duration of an after image. He "obtained (after resting the eyes five minutes and exposing them for one minute) an after image of the clear sky and the bars of a window, which can be seen at the present writing, after an interval of eight months. During the first hour the oscillations occurred continually, at first at intervals of about ten seconds, the panes and bars displaying brilliant and beautiful colors, mostly greens and purples. In the course of the first month the after image became gradually less distinct. On closing the eyes it always appeared positive, becoming negative after a few seconds, and passing through a series of oscillations which could be continued indefinitely by altering the illumination. Since that time the after image has become continually less distinct."

Washburn (67) made a very interesting contribution to the discussion of the subject in her report on the effect of sustained attention on the normal flight of colors, with the effort to "alter the colors subjectively." In order to determine the "effect" or "change" it was necessary to establish beforehand the normal flight of colors for a few subjects. These were three in number, in addition to the author, who first established the "normal sequence." The stimulus was reflected light from the sky. The three subjects, all students of psychology, were practised "until there was consistency between the reports." This appeared to be necessary, as the writer points out that "a wholly unpractised observer watching the course of an after image for the first time reports chaotic results, and no two such observers agree as to the alterations in color which occur." The results of the practice "were almost perfectly uniform." The *exact* sequence of the colors is rather hard to determine from her account. After the momentary positive same-colored image there was an interval followed by a positive image. This was colored with patches of red or green. Then the image revealed the "panes" as sky blue.

This passed into vivid green, which usually disappeared and reappeared five or six times, growing paler, almost whitish, towards the end. This neutralizing of the green seemed to be due to the gradual emergence of the complementary color, for the next color was red. This in turn gave place to a deep blue image, which lasted longer than any of the others, growing gradually darker until it became indistinguishable. One subject characterized the last phase as dark green or sometimes as bluish green. The duration of the exposure in this case was twenty seconds, with the light from an upper part of a window. With variations in the time of exposure to ten and fifteen seconds the course of the image was not affected. Variations in the intensity of illumination used did somewhat influence the color changes. With a cloudy sky and much diminished illumination the blue and green positive images were missing.

In another article (68) Miss Washburn reported a number of observations on the color sequence in the after image in central vision and in peripheral vision. Her method was that of "overlapping images in such a way that the portion of the retina which corresponds to the overlapping part of the image shall have been stimulated twice as long as the portions corresponding to the rest of the image." This, it was suggested, would provide a method of studying the effect of duration of the stimulus superior to that of a comparison between successive stimulations. The stimulus in the first experiment was transmitted sunlight through a window from a cloudy sky or from a "sun illumined snow field." The sequence of colors under these conditions was, after a short after image of the window, bluish white, changing to a rather bright blue, green, red, dark blue, very dark green sometimes indistinguishable as to specific color. The duration in this case was fifteen seconds, and is designated as the maximum duration. As the intensity was the maximum obtainable for ordinary daylight, this sequence of colors is called the "maximum color series." No change was observed when the duration was increased. No statement is made as to the periods of duration which were used. When the field of stimulating light was uneven in its stimulating effect the image showed disparate color sequences. "The more stimulated parts of the image (as to intensity) take longer to go through the succession of colors than the less stimulated parts."

Thus the parallelism appears to be somewhat like this, the more stimulated parts of the image lagging behind the less stimulated parts by approximately a "stage" in the color sequence.

More intensely stimulated parts	Less stimulated parts
Blue Green, etc.	Green Red, etc.

"Thus we can see that after the maximum series has been reached, increase in the intensity of the stimulating light increases the duration of the several color stages in the series." The author does not indicate the position of these parts in the image and the reader is left to wonder whether she is speaking of the central image and the surrounding color regions such as have been described before as *ring* and *edge* and outer *field*, or of something else. She "overlapped" the images from successive stimulations of the retina, so as to obtain a zone of coinciding images and disparate zones, one on each side. This was done by "fixating one point on a bright surface for about fifteen seconds, closing the eyes for an instant and then fixating a different point on the stimulating surface for fifteen seconds." According to the author the overlapped part of the image corresponds to a part of the retina which has been stimulated during a period twice as long as the other parts. The result is that the overlapped part of the image exhibits the same sort of behavior as did the image produced by more intense stimulation. The schema appears to be like this:

Single image	Overlapped images	Single image
Green Red, etc.	Blue Green, etc.	Green Red, etc.

In other words, "when the maximal series has been reached, further increase in the duration of the stimulus increases the duration of the color stages in the series." If the intensity be reduced or the duration shortened to seven or eight seconds, the sequence of colors is different. The series is blue, red, darker blue, faint greenish black. Thus the chief difference is "that the first green stage is dropped out." This is stated to be the "first qualitative effect of diminishing the intensity or duration of the stimulus." Approximately the same sort of change takes place with further reductions in intensity or time of exposure. Formally stated, the result is as follows: The progressive effect of diminishing intensity or duration, is a shortening of the stages of the maximal series, dropping out of

the first green stage; shortening the stages of the second series (blue, red, blue, green), dropping out of the second blue stage.

Miss Washburn also reports some experiments made with peripheral vision. The stimulus was white daylight through a square opening in a black window screen, subtending an angle on the retina of about 1.5 degrees. The peripheral distances selected were between five and fifteen degrees. No data are given beyond a few general observations. The most noteworthy of these are: The peripheral image is smaller than the central image; the positive white-light image is practically colorless in a darkened field with covered eye; the negative image comes after a long interval and is difficult to see. "But when it comes it is always colored, a violet red, often scarcely distinguishable from the dark field, but unmistakable in color when seen."

Külpe (37) noted the sequence of the flight of colors in the after image of the sun. "Thus, after looking at the sun for at most 0.5 seconds I have seen (1) a bright after image, which (2) took on a red border; (3) then the center became green, and a violet area appeared beyond the red border; (4) then the violet became dark gray and the red and green center pure blue; (5) then the blue changed to white, with a red border; (6) then came a rose-violet center, with dark blue border, while the dark gray area beyond took on a greenish color; and finally (7), the whole image was blue, with bright green border, upon a white field. This succession of phases occupied several minutes, and others would undoubtedly have followed if I had not interrupted the observation."

Franz (22), writing on after images, called attention to the fact that individuals differ in their account of the color changes, and further, that the same individual did not always see the same colored after image when stimulated with the same light. "At one time, all the images would be seen as light alone; at another, they appeared gray or reddish. This change appeared with all my subjects."

McDougall (39) has written on the *Farbiges Abklingen* of after images in some detail. His observations were made on the images from white light from various sources, which range through different degrees of intensity. All lights, "except in the case of the dullest light that will yield an after image in the dark," show coloration in the after image. It is by no means easy to disentangle the facts from the account given by McDougall. Apparently he used different durations, as well as different intensities, but they seem to have been used in an irregular order. The results of his observations may be conveniently summarized in the following tabular form:

	Stimulus	Description of the image	Sequence
	Dim white light	A fuzzy gray patch, which dies away in the course of a few seconds.	
I	Dull white light	Sometimes hazy for one or two seconds, sometimes a gray, and sometimes a blue follow immediately. Red appears almost invariably a few seconds after light is excluded. Struggle with green. Green predominates and persists to end.	Gray or Blue Red Green
II	Rather brighter white light	Colors more saturated. Blue, though frequent is least constant, and is often replaced by violet tinge. Red is rather less constant, the last green is always dark, and of fair saturation.	Blue or Violet Red Green
III	Still brighter white light. Reflected sunlight through milk glass. (Fixated spot on disc, with both eyes at 18 inches distance. Duration of fixation varied.)	*Case A.* Fixation for ½ second. Bright blue image of fair sat. Then less sat. and gives way to dark green. *Case B.* Fixation for 5 seconds. Hazy at first, then bright red came out of haze. Red disk became momentarily yellow. Gave place after 30 sec. to dark pure green. Faded slowly. *Case C.* Fixation for 20 seconds. Bright yellow-green disk with red edge. Red disk with patches of y-g. Pure red disk, with narrow blue border. Red shrinks and disk becomes blue, with patches of red struggling in center. Blue wins and remains for about 50 seconds. Green then fills the image and fades slowly.	Blue Green Hazy Red Yellow Green Yellow-Green Red Blue Green
IV	Still brighter white light. Transmitted sunlight through ground glass. (Fixation for 25 seconds.)	Brilliant bluish-white, became blue-green, with green edge. Blue disappeared leaving bright pure green disk. Red appeared on the edge, green retreated and y-g patches appeared on red disk. Then disk became red with blue edge. Red and blue struggled as before, leaving a blue disk. This persisted for some time, struggled with green, and green persisted to the end.	Blue-White Blue-Green Green Red Blue Green

McDougall adds: "The two observations last described illustrate a very constant feature of such after images, namely, the tendency of the three primary colors to follow one another in a recurring cycle of the order G.R.B.G.R.B. In one case the cycle passes from G. to G., in the other from B. through G.R.B. to G. again, thus almost completing the double cycle." It must be noted, however, that the stimuli were not the same, nor were the periods of exposure equal. Further, the sequence is not from G. to G. except in one case, that with twenty-five seconds' exposure. In the other observation the first green is described as 'bright' yellow-green. On the basis of the evidence given it is difficult to accept the statement of the cyclical character of the sequence. The author supplements the above account by some further statements. He says: "An important feature of the after images of bright white light is that, after the first short period in which the two colors fuse to give yellow, or, as in the case after the brightest lights, all three fuse to give white, the colors that in turn occupy the area of the after image alone and unchanging for considerable periods, are R.G. and B. only, and these are in every case of exactly the same color-tone, although varying in brightness or intensity in different cases and in different stages of one after image." "The yellow which frequently follows at once upon the white light always reveals its mixed character by resolving itself into green struggling upon a red ground, or, more rarely, into red struggling upon a green ground."

Nagel (44), who was a deuteranope, points out that in his own case the stimulation of the retina by a strong white light produces a very lively blue image. Projected on a small bright color field, the blue of the image supplements the yellow to form white. Nagel tried the effect of a very short period of stimulation of the retina and obtained a blue after image. He exposed one eye to the bright light of the sky for 0.1 seconds. There was a colorless interval of several seconds, then the image developed as a well-saturated dark blue, upon which the after image of the darker objects, *e.g.*, the window bars, stood out in dark yellow. He remarks that under the same conditions in which he sees the image as a lively blue other observers with normal color sense see the image as colorless. Priestley (52) quoted M. Hey to the effect that a person who recovered from complete amaurosis reported that the first time he saw the fire it was a bluish color. This observation, says Priestley, agrees with that of De la Hire and others that the weakest impression produced by objects very luminous is bluish. Edridge-Green (19) reported

a case of red-green color-blindness (male) where the image of the sun thrown on a white wall was seen as a black spot. "This spot does not appear colored or change color, but simply fades away."

Scott (58), investigating the general problem of suggestion, conceived the method of "controlling by suggestion the sequence of colors in the visual after image secured from fixating white light." College students were used. These were doing "the first course in experimental psychology at the time." The method of procedure was to take the subject into a room filled with colored objects, color charts, color wheels, etc. A prism was used to produce a spectrum. "The student was told that just as the prism analyzed the white light into the spectral colors so an after image from white light would contain the spectral colors in sequence." The entire situation was intended to increase the suggestibility of the subject. The stimulus was light which came through a 12 cm. square opening in a screen. At a distance of three meters the subject looked through the opening directly into the white skylight. The duration was twenty seconds; then with closed and covered eyes the subject began to report the sequence of colors perceived. Leading questions were given to enhance the suggestive value of the experiment. "Let me know as soon as the red appears." "Is it red yet?" etc. This was continued for twenty seconds or until red was reported. The same procedure was continued for the other spectral colors. Some images lasted for several minutes, but sometimes the duration was as short as thirty seconds "succeeding the first appearance of any color." Only those records were used where there were "colors reported for the twenty seconds succeeding the first report of the presence of any color in the after image."

According to Scott the sequence under these conditions is "first a blue, then green, then red and then finally a blue." Red does not ordinarily appear during the first twenty seconds. If it did appear in this experiment it was due to "suggestion." "Apart from suggestion an orange would certainly not succeed a red during the first twenty seconds." Scott gives very few data in connection with this part of the experiment. Under "suggestion" one subject gave these reports for three trials:

(1) Red, orange, yellow, green, blue and violet.
(2) Red, orange, yellow, green.
(3) Red, orange, yellow, green, blue and violet.

In later trials the conditions were changed somewhat, the subject being told that "with the new conditions the spectral order would

not be secured." The subject then reported in three trials "the normal sequence, with certain variations as is common to this experiment." In one trial red appeared before it should have done, *i.e.*, "before the limit of twenty seconds." Orange did not succeed a red.

Titchener (65) remarks of the observation of the flight of colors in the after image that "it shows in a striking way the effects of practice. The report of a wholly unpractised observer is a mere chaos. With attention, the uniformity of the phenomena soon becomes apparent; and presently the observers, who at first gave radically different accounts of the after image, will reach agreement upon all essential points." His report of the sequence is somewhat detailed. "With an unclouded sky, or a sky thinly covered with clouds and presenting an even white surface," the flight of colors is as follows: (*a*) A momentary positive and same colored image; (*b*) interval of five or six seconds; (*c*) positive image, with patches of red and green; after one or two seconds the image becomes sky blue; (*d*) green takes place of blue; green suffers some saturation changes, becomes paler, almost whitish. Some observers now see: (*e*) Yellow, regularly followed by (*f*) deep red; the image here becomes negative; red fluctuates; (*g*) deep blue; persists for some time and gradually darkens with or without passing into (*h*) a dark green image. The sequence therefore is blue, green, yellow, red, blue, green.

Homouth (32) has made a very detailed study of the color sequence in the after image; this being in every way the most extensive treatment of the subject which has appeared in recent years. Homouth used chromatic light stimuli as well as white light, and the major part of his data is devoted to the experiments with the colored stimuli. His source of light was a Nernst lamp of about 330 candle power placed in a dark box. The aperture was keystone in shape, with the dimensions of 15.4 cm. radius and 10 degrees angular distance. The light rays passed through a milk glass plate placed in the front wall of the box, and the intensity of the light was cut down by a sheet of writing paper. He used a dark adaptation period of ten to twenty minutes before each observation, with a period of exposure from one to four minutes long. The author seems to have been the only observer, the series of observations extending over a long period of time. Several factors are mentioned as conditioning the results, chief of these being a long continued period of practice in the observation of the after images. Dark weather and good health seem to have been favorable conditions for the experimental

work. Of the light stimuli used, a yellow light produced an image in which the chief features of the flight of colors were observed to the greatest advantage. Spectral analysis showed this light to be relatively very composite. The white light used is described as presenting an appearance of a weak yellowish toned white. The chromatic after images of this white light are stated to be in many instances completely identical with those of the yellow light. Homouth described at length the color changes of the yellow light, and his account of the changes in the white light image is stated in terms of differences between the two series. (Mit dem durch die Gelberregung hervorgerufen psychischen Erfolge ist er in einigen Fällen vollständig identisch. Die Unterschiede sind folgende.) He distinguishes four regions or areas in the image, to which he applies the names, (*Kern*) center, (*Rand*) a narrow border, (*Kontrast Rahmen*) outer edge and (*Hof*) the field out to the extreme periphery. Homouth has presented some excellent colored sketches of these areas in the after image (32b). The sequence of changes in the different areas is shown in the following table.

The numerals refer to the stages of the image:

Kern	Rand	Rahmen	Hof
1 Deep indigo blue well saturated.	Slightly sat. purple - violet.	Pure white.	Greenish. Some violet in the extreme periphery (very indistinct reddish violet).
The reddish violet of the extreme periphery appears to spread over these regions.			Greenish.
2 Blue.	Yellow present indicated by brown spots in the purple-violet.		
3 Blue shows in spots through purple - violet (From the Rand).	Yellowish.	Yellowish.	Greenish.
4 Yellow begins to cover the center. Rivalry and some brownish mixtures.		Yellowish to brownish orange.	
5 Center becomes more brownish, yellow tending to predominate.			
6 More sat. yellow.	Areal distinctions have almost disappeared.		

This series shows a sequence of three colors, blue, purple-violet, and yellow. "These colors are not connected with each other in steady transitions but always shift abruptly. During almost the whole period of the flight these three colors strive together for supremacy. Particular stages of this rivalry are those *Schlierbilder* in which at the same place of the visual field two of the three colors appear to consciousness." He points out what other writers have noted, that the colors under certain conditions move from the periphery towards the center. (Ein Zurickspringen der Farben vom

Centrum nach Peripherie habe ich jedoch hier nicht beobachten können).

Other experiments were made with sunlight in direct vision and also "morning light" through a milk glass plate. The image of the sun, after direct fixation for about 0.5 minutes showed on a dark field these changes: A small image of bluish white color, surrounded by greenish yellow, and this in turn surrounded by a purple red border. Then the greenish yellow overflowed the blue, which, however, reappeared through the yellow. This was followed by the overflow of the purple red over the whole image. Eventually the yellow reappeared in the center, and out of the yellow came light blue. This process was repeated several times. Then appeared on the border dark blue, which spread over the entire image, and out of the blue reappeared the purple, then yellow, and lastly light blue. (Eine Farben von der anderen noch eingefasst oder sie vollständig verdrängend, wobei wohl auch ein oder das andere Bildchen einmal ausblieben kann). The series ended with black, which appeared as an indefinite shape surrounded by dirty yellow. The duration of this type of after image was estimated to be five minutes or more.

The sequence of colors in the after image of "morning light" seen through a milk glass was greenish yellow, surrounded by purple red and a reddish field. Then followed a well-saturated yellow, surrounded by purple and a bluish gray field. The purple then filled the center, which was followed by well-saturated blue, pale greenish blue, reddish yellow, in which blue would appear as a tiny spot.

Homouth states the chief results of his experiment as follows: (1) The colors of the after image are not connected with each other through gradual transitions, but appear somewhat sharply separated from each other in the visual field. (2) The qualities in these discrete stages of the Abklingen are, for all the stimuli, approximately, the same three, and these are blue, purple, and yellow.

Miles (41) devoted a section of his article on the "Formation of Projected Visual Images" to a brief discussion of the color changes in the image. The subjects were asked to report the appearance of the "fixated cross" in the image and the color of the disc upon which the cross appeared. He used as stimulus the light from an incandescent mantle exposed for two seconds. All work was carried out with bright adapted eye. He reported that his "records emphasize the fact that, in visual experiences, individual differences are most marked." Color changes for some subjects were "very scanty," and "in these cases the image was of short duration." For others, there

was considerable play of very vivid and distinct colors. "This seems to show that a regular color sequence for light of any particular physical intensity is dependent on personal characteristics, and is not a resultant of the absolute intensity of the light." One subject gave reports of a regular sequence, blue, green, red. Another gave blue, red, "with yellow appearing as frequently as green." Other subjects "show but little evidence of any predominating sequence of color." In connection with the duration of the image, he noted that some subjects "appeared to show very little variation in the duration of the image from test to test." Others began with long duration images and steadily decreased, as the observations were continued. A third type "showed the reverse effect." In one case "no image was seen after the first two exposures. Then followed, at successive tests, images which lasted 47, 125, and 168 seconds, respectively."

Stevenson (64) performed some experiments at the University of Cincinnati on the negative flight of colors from a white light. He used a strong Nernst lamp as a stimulus. "The observer looked into the dark box from which all light had been excluded. At a signal, the experimenter raised the shutter, allowing the subject to look directly at the stimulus for different periods, from one fourth of a second to thirty seconds, and then the shutter was dropped." "When an image was seen in the dark box, the shutter was raised and the image projected on the white screen. Thus, for each image recorded in the dark box, one on the white screen was recorded." His summary of results in part is as follows: (1) The order of colors and the duration of the flight depend upon the intensity and the duration of the stimulus. (2) The negative flight can only be observed when alternated with the positive and soon fades away when projected upon a white surface. (3) The negative lasts longer than the positive. (4) The positive colors can be seen in a dark box when the eye is in full light of a room, but the flight does not last as long, nor is it as definite as when the eye is in complete darkness. (5) The first reports of most subjects are definite for the middle phases.

The essential features of this review of the literature from the beginning of the nineteenth century to the present time may be conveniently shown in tabular form. The following tabular summary shows the type of stimulus used, together with the details of the color sequence in the image:

Summary of the reports made on the sequence of colors in the after image of a bright light, from the beginning of the 19th century to the present.

Observer	Stimulus	Sequence of colors in the after image
Goethe	White paper in bright sunlight.	Brightness, yellowish, purple, blue, dark.
Purkinje	Candle flame.	Brightness, bright red, dark, followed by a brighter center. Becomes gray.
Brewster[1]	Reflected sunlight from mirror.	Spectra with the eye open Pink, orange, yellowish brown, yellow, red, orange. Spectra with the eye closed Green, blue, bluish pink, blue, indigo.
Fechner	Sun viewed directly.	White, light blue, light green, dark red, dark blue.
	White paper illuminated by sunlight.	Bright blue, violet, dark yellow or yellowish-green.
Brücke	Reflected sunlight from white field.	Green, blue, violet, deep red.
Seguin	Bright surface.	Series I Green, blue, violet. Series II Yellow, orange, red, violet, blue, green.
	Sun directly viewed.	Positive series White, yellow, green, blue, violet. Negative series Blue, green, yellow, orange, red, violet, blue, green, yellow.
Scoresby	Sunlight through window.	Green, yellow-green, yellow, orange, red, scarlet, crimson and brown, or olive.
Helmholtz	White light	White, greenish blue, indigo blue, violet or rose-red, grayish orange, dirty yellow-green.
	(Longer duration and more intense light).	White, blue, green, red, blue (on dark ground) and (on white ground) finally blue-green and yellow.
Aubert	White light	White, light blue, light green, yellow, red, yellow, white, blue.
Rollett	Sunlight through window.	Greenish blue, purplish violet, violet red, pale pink, dull yellow, olive green.
Hodges	Sunlight through window.	Yellow-green, dull orange, pink, crimson, dull purple, blue.
Külpe	Sun	Center of Image Bright, green, pure blue, white, rose violet, blue.
Washburn[2]	Sunlight through window.	"Maximum" series Bluish white, bright blue, green, red, dark blue, very dark green.

Observer	Stimulus	Sequence of colors in the after image
McDougall	Sunlight of different degrees of intensity.	(I) Gray or blue, red, green. (II) Blue or violet, red, green. (III) Yellow-green, red, blue, green. (IV) Blue-white, blue-green, green, red, blue, green.
Scott[3]	Sunlight.	Blue, green, red, blue.
Titchener	Unclouded sky or thinly clouded sky.	Positive and same colored, interval, positive with red and green, after a short time becomes blue, green, yellow, deep red, deep blue, dark green.
Homouth	Nernst lamp.	Blue, reddish violet, blue, yellow, and some "brownish mixtures," more saturated yellow.

[1] According to Brewster the eyes were alternately opened and closed during the experiments. It has frequently been pointed out that the effects of a secondary light upon the image is to cause it to shift towards the later stages of the color transformation. Further the vision was monocular during fixation. The effect of monocular vision on the color changes has not been carefully investigated up to the present time.

[2] This is the series which Miss Washburn designates as the "Maximum series" derived from the maximum duration and the maximum intensity of light stimulus (sunlight).

[3] Scott apparently took this to be the normal flight of colors on the authority of some previous writers.

SUMMARY OF LITERATURE

In the course of development of the literature on this subject the following results among others have been obtained:

1. The flight of colors has been obtained from different types of light stimuli. These are in part listed by Aubert as follows: The sun (Newton, Fechner); a bright flame (Purkinje); sunlight on white paper (Fechner); concentrated sunlight on white paper (Fechner); sunlight on white paper viewed through dark tube (Brewster); sunlight through window of dark room (Bonacursius, Fechner, etc.); electric spark (Seguin, Aubert). In addition to these, there have been the later observers who have used sunlight either reflected or transmitted. Homouth used a Nernst lamp.

2. The sequence of the colors in the after image has varied from one observer to another. Only in one or two cases has there been close agreement.

3. Several observers agree that the colored after image varies with intensity and duration of the stimulating light. Fechner,

Helmholtz, and Washburn agree that the phenomena are constant after a certain duration and intensity are reached, but below these the images vary in content and duration.

4. Goethe, Fechner, Seguin, Helmholtz, and Homouth agree that under certain circumstances the colors of the image involute from the periphery towards the center. Homouth and Seguin assert that the colors in the image of a very bright light do not always pass from periphery to center, but may appear in the center. Helmholtz asserts that the colors in the image when the stimulus is a moderate illumination appear to be irregular in the manner of their appearance.

5. Brücke and Scoresby assert that objects under low illumination do not give colored after images. On the other hand, Seguin asserts that the image of a white object is always colored. Very few experiments with low illumination have been reported.

6. The doctrine of the cyclical character of the color transformation in the after image has been advanced by McDougall. The cycle is a recurrent one of three colors, green, red, and blue. McDougall is not supported by the other observers in this opinion.

7. Washburn and Titchener have asserted the uniformity of the phenomena for the practised observers. Helmholtz also remarked: "There appears to be no essential difference among different persons in respect to the course of the after images of intense lights which have been developed under the same conditions. So far as they go my observations agree with those of Fechner and Seguin." On the other hand, Fechner, Seguin, and Plateau recognized the variability of the phenomena for different observers, at the same time insisting on the necessity of investigation of the invariable as well as the variable elements.

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CUTANEOUS SPACE

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The literature on cutaneous space during the past two years comprises a few studies of local signature, an experiment with a temperature esthesiometer, two cutaneous studies with amputates, an investigation of after-images of movement, considerable discussion of illusions especially those of motion and an experiment on the dynamogenic effects of light. Some foreign literature of earlier date which was delayed by the war is included in the present review.

Ruediger (9) discusses theories of tactual local signature especially the "sensory complex" theory versus the "sensory element" theory. His own experiments appear to substantiate the latter. The subject with eyes closed was touched upon the radial forearm, and then localized the spot with eyes open. Pressures of ten grams and one gram were used. According to the "sensory complex" theory the stronger stimulus should give more accurate localization. It failed to do so and in fact there was a slight tendency in the reverse direction. Moreover with the stimulus applied over a vein, where the subcutaneous portion of the complex would be uniform, less accurate localization should be found than elsewhere on the arm. The opposite result was obtained with seven of the eight subjects. In a supplementary series pure cold sensations were obtained and these were located as accurately as touch sensations or touch and cold combined. The writer therefore inclines to the "sensory element" theory.

Lufkin (7) disputes Watt's proposed "attribute of order" which, among other things, is based on the fact that "every touch spot can be distinguished from every other." Watt's experiments were performed on the forearm and Lufkin tried a region on the back where localization would be as free as possible from "empiristic motives (images, reflexes)." Preliminary experiments located an area bounded by the scapulae and the seventh and tenth cervical vertebrae where the observer was often unable to tell whether the right or left side of the spine was stimulated. Selected pressure spots in this region were systematically studied. Successive stimulation of two

spots on opposite sides of the spine yielded thirteen per cent. "same" judgments. There were also some judgments of this sort when the two spots were on the same side. The percentage of such judgments varied inversely with the distance between the points. With the same spot stimulated twice the report "same" was given only about half the time. The results do not confirm those of Watt on the forearm and the conclusion is that localization is a matter of perception rather than of sensation.

Turro (11) gives a critical resumé of theories of tactual space. As a result of his own experiments with children he concludes that in order to localize one needs either active movement or the reproduction of ideas of movement. In a study of amputates he found correct localization only when the subject moved the stump.

Katz (3) studied over one hundred cases of one-arm amputation. The usual illusion of the missing member was diminished in size in nearly every case. This is ascribed to loss of peripheral excitation. Normally we have a sort of sensory "tension" built up through experience out of our tactual and kinesthetic sensations from the limb, and the absence of these sensations gives the illusion that the limb is smaller. Experiments upon the side of the stump and a corresponding area of the normal arm yielded lower thresholds for touch and two-point discrimination on the stump. Articles placed on the stump were recognized more readily than on the normal arm. Localization, however, was poorer on the stump with a constant error in the direction of the shoulder. The author considers these phenomena to be due to attention.

Piéron (8) reports a novel study of thermal-spatial discrimination. The esthesiometer deposited two drops of water on the skin, thus giving a thermal stimulus without a pressure stimulus. Two-point thresholds were determined in this manner while the temperature of the water was varied from 32 degrees below skin temperature to 21 degrees above. At about skin temperature the threshold was much higher than at extremes of temperature. Comparison with an ordinary esthesiometer on the same cutaneous area was equivocal because of the difference in the size of the stimuli. It is obvious from the experiment, however, that there is a thermal-spatial discrimination.

Thalman (10) applied a moving stimulus to the forearm to see if an after-image of movement would ensue. Various stimuli were used—a knotted string, a wide strip of muslin, a belt of corduroy and a belt of corrugated muslin (with transverse strips attached

at intervals). The speed of motion and time of application were varied. All four stimuli produced some instances of negative after-images of movement. Only the corrugated muslin, however, gave compulsory conditions. With this stimulus (applied longitudinally) it was possible to find a speed and time for each subject at which he reported the after-image on every trial. The stimulus was sometimes removed when the motion stopped and was sometimes allowed to lie stationary against the skin. The latter condition was more favorable to the after-effect. Similar results were obtained on the calf of the leg with one subject. An additional series was performed under compulsory conditions to obtain detailed descriptions of the after-effect. It sometimes appeared cutaneous, sometimes subcutaneous, and sometimes both. In the first case it had a "bright" quality and in the second a "dull."

Benussi's discovery of a tactual illusion of movement produced by the stimulation of separate points in quick succession has been previously corroborated. Recent studies make a more careful introspective study of the illusion. Whitchurch (13) stimulated marked pressure spots using two intensities of stimulus, one that involved only the cutaneous organs and the other both the cutaneous and the subcutaneous. Optimal conditions for the illusion were determined. The distance and the time-interval between the stimuli were the most important factors in conditioning the optimal movement. The illusion involved an integration of quality, time, and cutaneous extent—a pressure diffusing, growing, and extending in time. Andrews' (1) preliminary series was similar to the above but two of his three subjects reported no movement at all. Hence he repeated the stimulation of a pair of spots several times in succession, *i.e.*, gave a rapid alternation of the stimuli for from 5 to 15 alterations. This procedure was designed to strengthen the association between the two spots. The instructions included "process" as well as "meaning." In this experiment all the subjects reported the illusion. It was variously described as a movement of one member, of both, or as full movement from the first point to the second. The "bow" movement in the air above the skin first described by Benussi was sometimes obtained, especially with one subject. Objective conditions did not seem sufficient for this illusion, the idea of the movement was necessary. In the "bow" movement when the subject attended to the sensations the "bow" disappeared leaving only the discrete pressure. The processes that carried the meaning were visual, kinesthetic, or both.

Krass describes a number of illusions involving every-day material. A variation of Aristotle's illusion is obtained (6) by rotating the left hand 180 degrees and placing it palm upwards on the table, while the right hand is placed palm downwards upon the left. A key laid along the inner side of both thumbs and moved by the middle finger of the right hand is then felt as two keys joined at the end. With the hands in the same position and the key placed across the hand with the ring on the left thumb and rotated by the forefingers of both hands the apparent rotation is the reverse of the actual. If the flat end of a pencil (4) is pressed on the ball of the finger so that it does not leave its position and the other end of the pencil is moved about, it seems as if the flat end were larger and made of gum. If a glass (5) is held with one hand while the other strokes the rim, the glass seems larger tactually than it does visually. If the inside of the glass is stroked with the ball of the finger it seems smaller.

Johnson's (2) subjects sorted cards that were perforated with four patterns of four holes each. Large goggles with frosted glass were worn so that, as the subject faced a wall he saw a uniform brightness but could, of course, discriminate nothing. In other series the subject wore the same goggles but the room was in darkness. Results were reduced to indicate the percentage of superiority of the performance in card-sorting under the light conditions over the performance under the dark conditions. The results of six subjects showed differences in favor of the light that are significant from the standpoint of probable error, with seven subjects there were slight differences of the same sort, while two others showed a slight, one (an astronomer) a large, difference in favor of the dark condition. The distribution curve of all the differences appears somewhat normal but the mean of the differences is plus 2.09 per cent., *i.e.*, in favor of the light conditions. Johnson concludes that "the inference seems justified that the tactile sensitivity is enhanced by uniform stimulation of the retina by light even though the visual and tactual impressions cannot be referred to the same object and vision cannot serve as a means of orientation."

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(N. B.—Starred references were not accessible to the reviewer.)

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J. W. Bridges. *Outline of Abnormal Psychology.* (2d Ed.). Columbus, O.: R. G. Adams, 1921. Pp. 226.

The second edition of Bridges' book comes at a time when popular as well as scientific interest in abnormal psychology has undergone considerable quickening because of the large number of mentally abnormal cases due to war, both soldiers in the army and others in civil life. In the present edition some errors have been corrected, and new material has been added. Blank pages are left for "notes." The second part, "The Mental Syndromes or Symptom-Complexes in Insanity," and the third part, "The Borderline Diseases: Psychoneuroses and Epilepsies," are retained although they are not properly subsumed under the title *Abnormal Psychology.* These two parts outline the groupings of symptoms, and in some instances the course, the etiology, and the nature of the disease.

Some of the defects of the first edition have been eliminated, references are more frequently given with dates so that editions of books can be determined, typographical errors have been partly corrected, and some definitions have been changed. In a first edition of a work of this character, involving as it does considerable checking and reference, much may be overlooked and criticism of minor points withheld. In a second edition it may reasonably be expected that all gross errors will have been checked, and that some of the lesser ones will be dealt with. In the present work, and the reviewer will confine himself to the part dealing with abnormal psychology, these expectations have not been entirely met.

The effort is made to give the neurological correlates of the abnormalities, which effort leads to absurdities of speculation. This is not decried as a totally bad practice, were it not for the fact that frequently the statements are given in such positive language that the reader is permitted no alternative unless his reading go beyond the limits of the references. The author goes so far as to state that any other explanation "does not relieve one from the necessity of giving an explanation in neurological terms" (p. 31). Synaptic resistances are overworked as explanatory conditions. In one place (p. 82) the changes in synaptic resistance is said to result in "a systematized amnesia."

Among matters needing revision or explanation are the following: the second definition of abnormal (p. 9) is a definition of pathological; pathopsychology and psychopathology are not necessarily parts of abnormal psychology (p. 10), they may be its correlates; decreased function (hypo- conditions) are not classified with the absences, increases or perversions (p. 10) but are in a separate group; reference to neurological literature will show that lesion of the primary cortical stations in the post-central convolutions is not accompanied by loss of cutaneous and kinesthetic sensations (p. 24), but by losses of special sensory abilities; the refusal to accept a distinction drawn by Esquirol is not a "theory" (p. 26); logorrhea cannot be a verbal hallucination described as "the escape of thought" (p. 28) and at the same time (p. 97) an "extreme garrulity"; there would appear to be no reason in a psychological text for an appeal to teleology (p. 43); in speaking of paradoxia sexualis it is meaningless to say that one form is a "*premature* development . . . *beyond the age of the child*" (p. 38); it is pedagogically bad, to say the least, to separate two conditions which are conceded to be alike without defining the supposed differences, as in speaking of "lower motor neurone" paralyses "and peripheral paralyses" (p. 89); the use of the description "at rest" (p. 91) does not define the conditions in an individual who is trying to maintain his balance on one foot; the invocation of the concept of memory loss to account for functional paralyses (p. 92) and for the aphasias (p. 95) is very questionable and probably gratuitous in view of the recent publications on the latter subject.

It is advantageous to get the facts clearly presented, and to indicate the possible or probable directions of explanation, but no good purpose is subserved by including meaningless and ill-formed statements. The criticisms are offered as additions and corrections; if space were available more points would be dealt with in the hope that the next edition will far surpass the second.

SHEPHERD IVORY FRANZ

GOVERNMENT HOSPITAL FOR THE INSANE

HENRY H. GODDARD. *Psychology of the Normal and Subnormal.* New York: Dodd, Mead, 1919. Pp. xxiv + 349.

The hypothetical flow of a postulated neurokyme over an imaginary neuron pattern is the keynote of explanation in Goddard's recent book, *The Psychology of the Normal and Subnormal.* The

book is written for "those beginning the study of psychology in Normal Schools and Colleges, teachers who read for themselves, parents who desire to understand their children." It will be interesting and profitable reading for all these people, but that it can serve as an introduction to general psychology is not probable, because it is not systematic, does not cover the whole field of general psychology, is practically silent on the elementary processes, has too much space given to inconsistent hypotheses, and shows practically no knowledge of recent experimentation in general psychology. One of the most frequent references is to James whose psychology was elaborated 32 years ago. There are 55 references, about half are psychological, practically none to original sources in the periodical literature of psychology.

The book begins with a discussion of the nervous system. The plates are good and the descriptions clear. But why should there be such a chapter in a psychology? Until we can *know* what nervous processes underlie conscious processes, and can formulate the laws governing these neural processes, nerve physiology can be of no service to psychology. It is the business of psychology to discover and formulate the laws and principles involved in the relations of stimuli to responses. For practical purposes these relationships are all we need to know. A college student having difficulty with his lesson will get no help from figure 18. A father looking for guidance in training his wayward son will get no assistance from figure 11.

In Chapter II Goddard discusses reflexes, instincts, perceptions and ideas. The discussion is in terms of neuron patterns. The reflexes and instincts depend upon inherited patterns. The author seems to accept the idea that consciousness is due to resistance in the synapse. "May it be," he says, "that two nerve fibers in contact or in close juxtaposition make manifest the energy otherwise imperceptible?" (p. 27). "The consciousness resulting from two or even twenty neurons is too faint to be consciousness, but when thousands are involved, it rises above the threshold" (p. 28). "Consciousness, especially in the higher thought processes is in some unknown way the result of some interference with the free flow of neurokyme" (p. 28). Neural interference gives rise to consciousness, the greater the interference, the greater the consciousness. When we come to Goddard's discussion of attention, we find that height of attention depends upon *ease of flow* of the neurokyme (p. 77). These two theories are inconsistent. In explaining the

conflict of stimuli in attention, we find (p. 79) the following: "There is a ready formed, instinctive pattern to which the stimulus of a loud noise instantly leads, arousing strong activity with its accompanying consciousness. But what becomes of the consciousness existent when the loud noise interrupted us? The answer is, it is eclipsed by the greater consciousness aroused by the stimulus." Thus, astronomy is brought to the aid of psychology! It has been a tradition in psychology now for some time to say that consciousness is due to interference in the flow of neural energy, when the least reflection or experimentation shows that the richest consciousness is in connection with *inherited* neural activity, in which case the flow must be easy and uninterrupted. In a violent emotion, so strongly do the processes involved hold the center or focus of consciousness, that other stimuli for the time can not be effective in arousing focal consciousness.

In chapters 4, 5, 6, 9, and 10, Goddard treats of memory, imagination, association, attention, and other higher processes. In his treatment of memory, in the main he follows Titchener. His explanation of the feeling of familiarity (p. 71) can hardly be satisfactory to the critical reader. We find the useless distinction between association by contiguity and similarity. On page 95, Goddard identifies them, but on pages 99 and 101 we find them to be different again. The author does not seem to see that identity of experience is the basis of all association.

On page 121, we find all important mental processes reduced to unity. "There is no possibility of differentiating (imagination, memory, association, attention) because they are all one and the same thing . . . only different phases of the same mental process" (p. 121). One might as well say that because a ball is both red and round, redness and roundness are one and the same thing, both being characteristics of the same ball.

In chapters nine and ten, thought and reasoning are discussed. "Thought appears when neurokyme in a simple neuron pattern is interrupted under conditions where there are associated neuron patterns into which that neuron energy may flow and lead to action" (p. 164). It is difficult to see in what sense "thought" is used. If *consciousness* is meant, the quoted statement can hardly be true. In the summary, p. 173, we read, "perception, judgment and reasoning are all phases of the thought process." Can it be that perception is due to interference? And can it be that "sensation is the consciousness of a stimulus"? (p. 165).

The psychology of learning is disposed of in a 14-page chapter on habit which shows no knowledge of the recent experimentation in this important field.

In his treatment of emotion, Goddard takes a position essentially the same as that of James. A situation sets into action various glands and other internal organs, by means of the sympathetic system. This activity sends to the cortex a complex stimulation which occasions sensations which are the essential part of feeling and emotion. We are not told whether feeling is another kind of sensation, whether it is a conscious element correlate with sensation, or whether it is an attribute of sensation.

One of the most interesting discussions of Part II concerns mental levels and their determination. In this field the author is at home and speaks from his large experience. The reader here finds helpful treatment of moral training, the relation of intelligence to control of the emotions, the moral imbecile, and various pedagogical applications of the facts discussed.

W. H. Pyle

University of Missouri

Downey, J. E. *Graphology and the Psychology of Handwriting.* Baltimore: Warwick & York, 1919. Pp. 142.

Dr. Downey has here summarized in compact form the present state of theory and experiment in the field of graphology and the psychology of handwriting. The material is presented in two sections. The first deals with three topics: (1) the basal concepts of graphology; (2) graphological methods, and (3) the graphological elements. The second section discusses some of the author's own experimental work on (1) the analysis of the factors entering into disguised handwriting, (2) the influence of mental and physical condition on handwriting, (3) the comparison of handwriting with other forms of motor expression, and (4) the comparison of graphological with character traits. Several of these studies are here presented for the first time. In the last named study the author discovered several very significant relationships, especially between small writing and interest in detail ($r = + .61$).

The main purpose of the book, as expressed by the author, "is one of orientation, preliminary to an attempt to use graphic activity in tests of temperamental or character traits." On the whole it serves its purpose well, though the person familiar with the tests

since developed by the author will find some difficulty in paralleling the test series with the material presented in this book. As a resumé of progress in the psychology of handwriting this volume stands alone.

M. Freyd

Ossip-Lourié. *La Graphomanie.* Paris: Alcan, 1920. Pp. 232.

This treatise on the disease of writing too much opens with a short review of the origins of written language and the underlying psychology of language. Under pathological conditions written expression degenerates. The object of the author is not to study such derangement but to observe literary graphomania as it occurs outside asylums. He does not, however, succeed in drawing a clear-cut picture of the malady. Mania for a literary career may be a common attribute of many sorts of egocentric vain individuals. Nor does the author draw a line between second and third-rate writing and the morbid variety. Possibly he thinks no line should be drawn. The creative writer who writes in order to say something instead of writing in order to write is not concerned with reputation. The graphomaniac suffers from the delusion of grandeur and wishes to draw attention to himself. He has a remarkable verbal memory and goes from the word to the idea; his pen moves faster than his attention, hence stereotypy and echo-phrases are a feature of his work.

Although literary graphomania is the chief form, there are other varieties of the disease, such as the mania for carving one's name on public monuments or on natural wonders (glaciers are cited!), and the mania for writing letters of the everyday and the anonymous sort. There are also simulators whose mythical productions never see the light of print. All in all, a frightful epidemic has invaded the world. Few individuals are immune, the majority have written or are writing a book or a pamphlet. Letters by the milliard, books by the thousands, pamphlets innumerable! And in train of the graphomaniac trails his sad satellite, the reading-maniac, vainly striving to keep abreast of the flood.

In discussing the causes of graphomania, the author blames, in part, a system of education which encourages writing without thought, by utilizing copy and dictation. The man who really thinks never writes rapidly; but rapid composition is enforced in school routine. Graphomania flourishes because of the failure of true criticism and the commercialization of literature. And then there

is the woman-movement,—and all women writers with only a few exceptions are graphomaniacs!

As a curative measure the author suggests educational reform. Graphomaniacs, once afflicted, rarely recover, but isolation, solitude, and silence are recommended as therapeutic measures worth trying.

JUNE E. DOWNEY

UNIVERSITY OF WYOMING

NOTES AND NEWS

A MONUMENT to the memory of the late Professor G. T. Ladd of Yale University, whose death occurred at New Haven on August 8, 1921, was unveiled in the grounds of a Buddhist temple near Tokyo, Japan, on March 11. The monument consists of a slab of grey volcanic rock. It stands on the top of the hill of the bell tower in the grounds of Soji-ji, the great Buddhist temple at Tsurumi. Beneath the slab are a part of the ashes of the psychologist and philosopher, brought to Japan at his request.

THE sixteen hundred volume library of the late Professor G. T. Ladd of Yale University, has been given to the Hatch Library of Western Reserve University from which Professor Ladd graduated in 1864.

PROMOTIONS in psychology and educational psychology at Columbia University are announced as follows: At Barnard College, Dr. H. L. Hollingworth to a full professorship; at Columbia University, Dr. A. T. Poffenberger to an associate professorship; at Teachers College, Dr. A. I. Gates, Dr. W. A. McCall and Dr. L. S. Hollingworth to associate professorships.

DR. HERBERT S. LANGFELD and DR. EDWIN G. BORING have been appointed associate professors of psychology at Harvard University, and Dr. Carroll C. Pratt instructor in psychology at Harvard University. Dr. Langfeld is promoted from an assistant professorship at Harvard. Dr. Boring has been professor of experimental psychology since 1919 and Dr. Pratt instructor in experimental psychology since 1921, both at Clark University. The psychological staff at Harvard will consist of Professors McDougall and Dearborn, Associate Professors Langfeld and Boring, Dr. Troland, and Dr. Pratt. Professor Sanford remains at Clark and assumes the headship of the entire department of psychology.

PROFESSOR A. PICK, the well known neurologist at Prague, is about to retire from his position as Professor at the University of Prague, and is willing to sell his library. It contains about 3000 volumes and about 7000 brochures, reprints and theses, on neurology, psychiatry and psychology, in English, French and German. Communications should be addressed to Professor Arnold Pick, Jungmannstr., 26, Prague, Czechoslovakia.

THE National Research Council has elected Dr. Raymond Dodge, professor of psychology, Wesleyan University, Chairman of the Division of Anthropology and Psychology for the year 1922-23.

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THE PSYCHOLOGICAL BULLETIN

1. GENERAL

395. Claparède, E., Theodore Flournoy—sa vie et son œuvre. *Arch. de psychol.*, 1921, **18**, 1–125.

Flournoy, the distinguished colleague of Claparède in editing the *Archives de psychologie,* died on November 5, 1920. His co-worker gives a full biographical sketch of the man's life, traces the development of his philosophical and psychological thinking, and presents a complete bibliography of his published articles and books, numbering 59 in all. Two photographs of Flournoy are shown,—one of them of particular interest to Americans because it shows James visiting with Flournoy. A chair of psychology was established in the University of Geneva for Flournoy in 1891, and in 1892 he established the psychology laboratory for that University. The *Archives de psychologie* he founded in 1901.

H. R. Crosland (Oregon)

396. Garten, S., Herings Farbenmischapparat für spektrale Lichter. *Zeits. f. Biol.*, 1921, **72**, 89–100.

Beschreibung des von Hering selbst gebauten Farbensmischapparats der sich im physiol. Institut zu Leipzig befindet. (von Hering erfolgte keine Veröffentlichung.)

P. Hoffmann (Würzburg)

397. Ellinger, P., Ein Apparat zur Aufzeichnung der Tropfenzahl und der in der Zeiteinheit zufliessenden Flüssigkeitsmenge. *Zeits. f. Biol.*, 1921, **73**, 115–116.

Eignet sich nicht zür Kürzen Besprechung.

P. Hoffmann (Würzburg)

398. Dunlap, K., Improved Forms of Steadiness Tester and Tapping Plate. *J. of Exper. Psychol.*, 1921, **4**, 430–433.

Author describes construction and use of an adjustable steadiness tester and a double tapping plate which have been found satisfactory for experimental work at Johns Hopkins and other universities.

C. C. Pratt (Clark)

399. Toops, H. A., Eliminating the Pitfalls in Solving Correlation: a Printed Correlation Form. *J. of Exper. Psychol.*, 1921, **4**, 434–447.

By means of a printed correlation form and a plotting machine the author has worked out a method which greatly reduces the usual amount of time required and the liability to error involved in calculating the Pearson *r*. The present article explains and describes the individual steps in the new procedure.

C. C. Pratt (Clark)

400. Seashore, C. E., Psychology as a Career. *Science*, 1922, **55**, 381–384.

The various forms of pure and applied psychology are outlined, together with the requirements for a career in psychology, and the types of work in which opportunities are open.

G. J. Rich (Pittsburgh)

401. Anon., Branches of the Psychological Corporation. *Science*, 1922, **55**, 448–449.

G. J. Rich (Pittsburgh)

402. McDougall, W., Prolegomena to Psychology. *Psychol. Rev.*, 1922, **29**, 1–44.

"The aim of psychology is to render our knowledge of human nature more exact and more systematic, in order that we may control ourselves more wisely and influence our fellow-men more effectively." Psychology belongs to the anthropological group of sciences. The psychologist studies animals for the light which such study throws upon human nature.

There are difficulties with the definition of psychology as the science of mind. Mind is a vague word. Furthermore, there are other mental sciences such as logic, metaphysics, epistemology, and

theology. Those who define psychology as the science of mind regard human nature as a combination of two things, mind and body. It is difficult to distinguish clearly between the two. Another difficulty of this type of psychology relates to method. Introspection has its limitations, but in spite of them the method can achieve a generalized description of experience.

Psychological observations are of three kinds: "(1) introspection, or the noticing of one's own experience; (2) observation of the conditions or occasions of experiences; (3) observation of the expressions of experience * * *." There is also a literary psychology the viewpoint of which is antiscientific.

Ancient psychology accepted the soul, but in the modern period this type of psychology has developed into the faculty theory. A rival of the faculty doctrine has been the *theory of ideas* which was developed by Locke, Berkely, and Hume. The view of these writers that the mind is a storehouse or a dark chamber should be banished to the psychological museum.

Psychology has been defined as the science of consciousness. "Consciousness" is a bad word. It reflects our tendency to reify, *i.e.*, to make a thing or stuff of. Another type of psychology aims to explain behavior in terms of the physiological mechanisms. It attempts to reduce human action to the reflex type of mechanical response.

Mechanistic psychology rests upon two assumptions: "(1) that mechanistic physiology will at some remote date prove adequate to the task that lies before it, namely, the working out of a complete description and explanation of the bodily processes of organisms (including the human organism) in terms of the mechanistic principles of physics and chemistry; (2) that it is, or may become, possible to give an intelligible account of the relation between the facts of experience and the facts of behavior, in terms compatible with mechanistic physiology." An examination of these assumptions shows that it is premature to claim that human action can be adequately described in terms of the categories of physical science.

The writer outlines an attitude to be taken toward physiological knowledge and defines psychology as the science of the human mind. The mind "of the individual organism is that which expresses itself in his experience and in his behavior * * *." "The psychologist has, then, to build up his description of the human mind by inference from the observed facts of behavior, the behavior of men and animals, and from the observed facts of experience, facts of his own

experience observed introspectively and facts of others' experience described and recorded by them."

P. T. Young (Illinois)

403. Tolman, E. C., A New Formula for Behaviorism. *Psychol. Rev.*, 1922, **29**, 44–54.

A great deal of modern behaviorism is physiological. It is possible to develop a nonphysiological behaviorism "capable of covering not merely the results of mental tests, objective measurements of memory, and animal psychology as such, but also all that was valid in the results of the older introspective psychology." In this way it will be possible to escape the formal inconsistencies of the subjectivistic formula.

Four concepts are proposed which seem to be required by the new viewpoint: (1) "The *stimulating agency* may be defined in any standardized terms, those of physics, of physiology, or of common sense, and it constitutes the independent initiating cause of the whole behavior phenomenon." (2) The "*behavior-cue*" is equivalent to the sense quality of the older psychology: "* * * where the older psychology talked about sense-qualities our new behaviorism will talk about behavior-cues." (3) The "*behavior-object*" is analogous to the older concept of *meaning*. It "is to be defined in the last analysis simply in terms of the group of behaviors to which it may lead." (4) The "*behavior-act*" is "simply the name to be given to the final bits of behavior as such."

P. T. Young (Illinois)

404. Roback, A. A., Intelligence and Behavior. *Psychol. Rev.*, 1922, **29**, 54–63.

A number of formulations of intelligence are briefly reviewed. The notion of "capacity for responses or adjustments" is an important component of the definitions. Behaviorism has not furthered our knowledge of the problem.

P. T. Young (Illinois)

405. Mursell, J. L., The Stimulus-Response Relation. *Psychol. Rev.*, 1922, **29**, 146–163.

The ultimate assumption of behaviorism is that all the phenomena proper to psychology can be formulated in terms of the stimulus-response relation in such a way that, given the stimulus, the response

is determinate, and given the response, the stimulus is determinate. "A response is any change whatsoever in the condition of an organism, brought about by external influence. And a stimulus is any external influence which brings about a response."

The writer concludes that "in the stimulus-response relation we have a concept that is not inadequate to serve as the basis for an objective psychology." The stimulus-response concept may serve as a working hypothesis. This hypothesis, however, does not justify the behaviorist in ruling out consciousness. The discussion is based in good part upon recent discussions by Professors Calkins and Warren.

P. T. Young (Illinois)

406. Lindsay, E. E., Questionnaires and Follow-up Letters. *Ped. Sem.*, 1921, **28**, 303–307.

The use of follow-up cards to maintain and stimulate response to questionnaires is shown effective by graphed results.

J. F. Dashiell (North Carolina)

2. NERVOUS SYSTEM

407. Loeb, L., Transplantation and Individuality. *Biol. Bull.*, 1921, **40**, 143–180.

The method of transplanting tissues can be used in the analysis of individuality. If a tissue is removed to another portion of the same organism (guinea pigs and rats being used) certain intrinsic factors favor its growth. If transplanted to another animal, the body fluids of the host show a toxic action and lymphocytes invade the foreign tissue. When near relatives are used as hosts, the specific destructive effect is less marked than in the case of unrelated animals. It seems probable that every organism possesses an individuality differential, which is a specific quality of the organism present in all its parts.

H. E. Jones (Columbia)

408. Schilling, R., Ein Reifeichungsverfahren für Gürtelpneumographen. *Arch. f. Laryngol. u. Rhinol.*, 1921, **34**, 235–256.

Der durch Gutzmann in die Phonetik eingeführte Gürtelpneumograph bedarf einer Eichung. Hierzu dient ein künstlicher Thoraxquerschnitt, dem der pneumatische Gürtel ebenso umgelegt werden

kann, wie dem natürlichen Thorax. Es zeigt sich, dass der Gürtelpneumograph einen aus Umfangsveränderung und Durchmesserverschiebung zusammengesetzten Vorgang registriert.

O. Klemm (Leipzig)

409. Spiegel, E. A., und Sternschein, R., Der Klammerreflex nach Sympathicusextirpation. Ein Beitrag zur Frage der tonischen Innervation. *Arch. f. d. ges. Physiol.*, 1921, **192**, 115–117.

Unabhängig von den Untersuchungen von Kahn wird ein Verfahren beschrieben, um alle zur vorderen Extremität des Frosches ziehenden sympathischen Nerven zu durchschneiden. Nach einseitiger Durchschneidung ist ein Unterschied im Tonus beider Seiten nicht zu konstatiren. Die Verfasser lehnen daher die Lehre de Boer's ab, dass der Muskeltonus sympathischen Ursprungs ist.

Bethe (Frankfurt a/M.)

410. Rothfeld, J., Experimentelle Untersuchungen über den Einfluss der Grosshirnhemispheren, des Mittel- und Zwischenhirns auf die vestibularen Reaktionsbewegungen. *Arch. f. d. ges. Physiol.*, 1921, **192**, 272–304.

Rothfeld findet beim Kaninchen im vordersten Teil des Thalamus opticus ein Zentrum für die schnelle Komponente des vestibularen Nystagmus nach der gekreuzten Seite, im hinteren Teil des Thalamus ein Zentrum für die langsame Komponente zur gleichnamigen Seite, im Mittelhirn ein Zentrum für die vestibulare Kopfdrehung. Die Reaktionen des Körpers und der Extremitäten nach Drehung (Manegebewegungen u. s. w.) sind in komplizierter Weise von den Reaktionsbewegungen des Kopfes abhängig.

Steinhausen (Frankfurt a/M.)

411. Reuter, I., Untersuchungen über einige Extraktstoffe von Cryptobranchus japonicus. Zugleich ein Beitrag zur Kenntniss der Kreatinbildung im Tier. *Zeits. f. Biol.*, 1921, **72**, 128–140.

Bei der Untersuchung der Organischen Extraktstoffe von Cryptobranchus japonic. fand sich Kreatin, Methylguanidin, Fleischmilchsäure dagegen kein Arginin.

P. Hoffmann (Würzburg)

412. Broemser, P., Nervenleitungsgeschwindigkeit und Temperatur. *Zeits. f. Biol.*, 1921, **73**, 19–28.

Die Nervenleitungsgeschwindigkeit ist nicht in der Weise von der Temperatur abhängig, wie man nach den versuche von *Snyder* annahm. Die durch Aufbewahrung in isotonischer Ringerlösung verschiedener Temperatur beeinflusste Nervenleitungsgeschwindigkeit des Froschischiadicus strebt mit der Dauer der Aufbewahrungszeit dem Werte $\sqrt{\frac{p_0}{\sigma}}$ zu. Die Nervenleitungsgeschwindigkeit im lebenden Tier ist wahrscheinlich nur in geringem Masse von der Temperatur abhängig.

P. Hoffmann (Würzburg)

413. Nörr, J., Fötale Elektrokardiogramme vom Pferd. *Zeits. f. Biol.*, 1921, **73**, 123–128.

Nörr, J., Elektrokardiogrammstudien am Rind. *Zeits. f. Biol.*, 1921, **73**, 129–140.

Eignet sich nicht zür Kurzen Besprechung.

P. Hoffmann (Würzburg)

414. Plaut, R., Respirationsversuche an neugeborenen Tieren. *Zeits. f. Biol.*, 1921, **73**, 141–150.

Man findet zunachst ein Ansteigen des O-Verbrauchs, dann ein Zurückgehen auf den nach Rubner und Voit aus der Oberfläche zu berechnenden Werte von 1000 Kal. für 1 qm.

P. Hoffmann (Würzburg)

415. Haberlandt, L., Über Trennung der intrakardialen Vagusfunktion von der motorischen Leistung des Froschherzens. III. Versuche über Totenstarre des Herzens. *Zeits. f. Biol.*, 1921, **73**, 151–166; 285–318.

An Froschherzen, die 20 bis 24 Stunden nach Ausspülung mit physiologischer Kochsalzlösung aus Totenstarre durch Blutdurchströmung wiederbelebt werden, kann eine Vauernde oder vorübergehende Ausschaltung der Vagusendigungen erzielt werden.

P. Hoffmann (Würzburg)

416. Ackermann, D., Über die Extraktstoffe von melolontha vulgaris. *Zeits. f. Biol.*, 1921, **73**, 319.

Kreatin und Methylguanidin kommt im Maikäfer nicht vor, dagegen Arginin.

P. Hoffmann (Würzburg)

3. SENSATION AND PERCEPTION

417. LAMPRECHT, P., The Metaphysical Status of Sensations. *J. of Philos.*, 1922, **19**, 168–181.

The writer speaks of Plato's views and of those of other philosophers in this connection, but the contention of the paper is that we do not get sense impressions as does wax from acting outside influences, there must be reaction. This is rather behavioristic, still the writer does not take the standpoint of contemporary behaviorism, for that has little to do with the qualities of sensation, and this is a point of emphasis with the writer. This neglect on the part of present-day behaviorists to reckon with these sensation qualities is one reason for its not being more generally adopted as an explanation of the obvious facts of reality. They have even gone so far as to deny that "psychic facts" exist because of a fear that epistemological discussions leading nowhere will be revived, in all likelihood; and this involved the denial of the existence of sensation qualities themselves. The error of behaviorists consists, in short, in the denial of every-day facts of which we are all conscious. On the other hand, the advocates of strict subjectivism deny the possibility of finding any contact between mind and matter. However, natural processes do not need the work of the logician to justify their existence; they are to be accepted, not explained. What we need is a naturalism, not to be mistaken for materialism.

T. R. GARTH (Texas)

418. LAU, E., Neue Untersuchungen über das Tiefen- und Ebenensehen. *Zeits. f. Sinnesphysiol.*, 1921, **53**, 1–35.

Im ersten Teil der Arbeit wird an der Hand von Versuchen am Hering'schen Haploskop eine experimentelle Bestätigung der Hering'schen Kernebenentheorie versucht, die für kleinere Sehwinkel gelingt.

Der zweite Teil (Horopterproblem) zeigt mittels eines sinnreichen Nachbildversuchs, wobei im Gegensatz zu der Jänsch'schen Anordnung der Mittelreiz zum Momentanreiz gemacht wird, dass Momentanreize *vor* die Ebene der Dauerreize gestellt werden müssen, wenn sie *in* dieser wahrgenommen werden sollen. Die grössere Krümmung des Tschermak'schen Momentanhoropters ist auf die starke Tendenz, den Blick auf Momentanreize zu richten, zurückzuführen, wobei dann die Einstellung auf symmetrische Konvergenz verloren gehen muss.

Der dritte Teil der Arbeit beschäftigt sich mit der Frage: Wie erscheint uns eine Mathematische Ebene bei bewegten Augen? Die Versuche des Verfassers bestätigen die orthogene Lokalisationstendenz Jänschs und ergeben, dass entfernte Ebenen konkav, nahe konvex erscheinen müssen. Die Uebergangsentfernung, in welcher die Ebene als solche erscheint, liegt etwa zwischen 4 und 10 Meter. (Beim Hillebrand'schen Phaenomen, bei dem es sich aber um das ruhig fixierende Auge handelt, ist diese Entfernung viel geringer.)

A. Kirschmann (Leipzig)

419. Fröhlich, F. W., Ueber den Einfluss der Hell- und Dunkeladaptation auf den Verlauf der periodischen Nachbilder. *Zeits. f. Sinnesphysiol.*, 1921, **53**, 79–108.

Diese interessanten Versuche wurden, im Gegensatz zu früheren desselben Autors, unter dem Einfluss verschiedener Adaptationszustände ausgeführt. Es handelt sich in der Hauptsache um die zweite positive Nachbildphase, das sogenannte Purkinje'sche Nachbild, das nach v. Kries in der Fovea centralis verschwindet, was aber von Hess u.A. bestritten wird. Verfasser stellte fest, dass das Purkinje'sche Nachbild bei Verwendung von geringen Lichtintensitäten, besonders bei dunkeladaptiertem Auge in der Fovea allerdings verschwindet, bei Anwendung grösserer Lichtstärken dagegen nicht, und zwar bei allen Adaptationsgraden.

Bei farbiger Reizung sind die erste und dritte positive Nachbildphase gleichfarbig, die zweite (Purkinje'sche) dagegen annähernd komplementär. Als Gesamtresultate seien noch erwähnt: Bei Dunkeladaptation ist die Reaktion auf kurzdauernde Reize verlangsamt. Die Nachbilder nehmen an Dauer zu. Der Ausfall des Purkinje'schen Nachbilds und der Hess'schen Ausbuchtung stehen in Zusammenhang mit der ungleichen Erregbarkeit der verschiedenen Netzhautzonen. Die langwelligen Farben zeigen geringere Nachbildwirksamkeit als die kurzwelligen.

A. Kirschmann (Leipzig)

420. Gehrcke, E., und Lau, E., Ueber Erscheinungen beim Sehen kontinuierlicher Helligkeitsverteilungen. *Zeits. f. Sinnesphysiol.*, 1921, **53**, 174–178.

Bei Gelegenheit der Aufgabe, auf einer photographischen Aufnahme von Interferenzstreifen, die eine unregelmässige, aber kontinnuierliche Helligkeitsverteilung zeigten, Linien gleicher Inten-

sität festzulegen, erregt die bekannte Tatsache, dass auch bei kontinuierlichen Helligkeitsübergängen Kontrasterscheinungen eintreten, die Aufmerksamkeit der Verfasser. Sie vergleichen ein durch mehrmaliges Umkopieren auf hart arbeitender Platte erhaltenes Bild mit der nach dem Augenschein gezeicheten Kurve gleicher Helligkeit und stellen fest, dass ersteres weniger Krümmungen zeigt. Es wird dann an einem weissen Kegelmantel dargetan, dass auch hier die subjektiven Kurven gleicher Helligkeit nicht mit den objektiven (die erzeugenden Geraden des Kegelmantels) zusammenfallen. Die Tatsache dass bei sehr geringer Beleuchtung (Stäbchensehen) die Erscheinung ausfällt, legt den Schluss nahe, dass es die Zapfen sind, die die Kontrasterscheinungen bedingen und dass die Stäbchen wenig empfindlich sind für Helligkeitsunterschiede.

A. Kirschmann (Leipzig)

421. Fröhlich, F. W., Ueber die Abhängigkeit der periodischen Nachbilder von der Dauer der Belichtung. *Zeits. f. Sinnesphysiol.*, 1921, **53**, 108–121.

Verfasser berichtet in dieser Arbeit über Versuche zum Beweise seiner Ansicht, dass periodische Nachbilder (wie auch der Farbenkontrast) in enger Bezihung zu den Reflexen stehen und daher den periodischen Reaktionen des Centralnervensystems zugeordnet werden müssten. Das Hauptresultat seiner Versuche ist: Zunahme der Belichtungsdauer und langsamer Eintritt der Belichtungschwankungen bewirken eine vollständige Aenderung des gesamten Nachbildverlaufes; sie verwandeln die schnell ablaufenden Nachbildphasen in solche von beträchtlicher Dauer. Im Verlaufe der Untersuchung wird weiter gezeigt, dass es sich bei dem von C.v.Hess berichteten, angeblich dem Reizlicht *gleichgefärbten* Purkinje'schen Nachbild wahrscheinlich doch um die erste positive (Hering'sche) Nachbildphase handelt.

A. Kirschmann (Leipzig)

422. Comberg, W., Das sogenannte "Schneelandschaftsphänomen." *Zeits. f. Sinnesphysiol.*, 1921, **53**, 179–185.

Für die allgemein bekannte Tatsache, dass ein Schneefeld oft bedeutend heller erscheint, als der darüber befindliche Himmel, versucht der Verfasser neue, von der Filehneschen abweichende Erklärungen. Er zählt folgende Möglichkeiten auf: (1) Objektive Verschiedenheit bezüglich der Lichtzustrahlung zum Beobachter,

z. B. grössere Entfernung und daher andere Absorption. (2) Blendenwirkung der Oberlider und Wimpern. (3) Verschiedene Helligkeitsempfindlichkeitszustände der oberen und unteren Hälfte der Retina. Die ganze Frage ist, wie es dem Unterzeichneten erscheint, nicht richtig gestellt. Es ist doch ganz selbstverständlich dass eine Schneefläche heller erscheinen kann als der darüber sichtbare Himmel (der für die Schneefläche fast nie die Lichtquelle ist) nämlich, wenn dieselbe durch die Sonne oder einen helleren Teil des Himmels beschienen ist. Die Frage sollte lauten: Kann bei völlig gleichförmig bedecktem Himmel eine Schneefläche heller erscheinen als der Himmel? und wir antworten: Niemals, sofern nicht anderweitige Lichtquellen in Frage kommen. Wird dennoch behauptet, dass man den *weissen* Schnee heller " sehe " als den *grauen* Himmel, so handelt es sich nicht um eine Wahrnehmung, sondern um komplexe Vorstellungen, bei welchen das tatsächlich Gegebene durch das Wissen um die Dinge Korrigiert wird. Es gibt keine Wahrnehmung " weisser oder schwarzer Gegenstände," sondern nur Wahrnehmung " farbloser Flächen " von verschiedenen Helligkeitsgraden.

A. Kirschmann (Leipzig)

423. Filehne, W., Ueber das optische Wahrnehmen von Bewegungen. *Zeits. f. Sinnesphysiol.*, 1921, **53**, 134–144.

Lediglich, wenn ein Bezugssystem gegeben ist, kann beim Hinstreichen eines Bildes von der Netzhaut aus die Wahrnuehmung einer objektiven Bewegung entstehen. Dabei bleibt es sich gleich, ob Netzhaut oder Bild sich bewegt. Darum haben wir, wenn wir in ruhender Umgebung den Blick umherschweifen lassen, keinen Eindruck von Ortsveränderungen im Gesichtsfeld, wenigstens soweit nicht translatorische Augenbewegungen dabei im Spiel sind. Nicht die Ueberzeugung von der objektiven Unbewegtheit ist daran schuld, sondern der Mangel eines Bezugssystems.

Nun ist es eine bekannte Tatsache, dass ein objektiv bewegter Gegenstand, wenn wir den Blickpunkt mitbewegen, nur halbsogrosse Geschwindigkeit zu haben scheint als bei fixierter Blickrichtung (Exner-Fleischl'sches Paradoxon). Verfasser gibt nun eine neue einfache Erklärung dieser Erscheinung, die nicht als Täuschung angesehen werden dürfe. Beide Eindrücke sind richtig. Wird ein Punkt der Bahn fixiert, so bilden die ruhenden Objekte das Bezugssystem, und die ganze Winkelgeschwindigkeit wird dem bewegten Objekt zugeschrieben, Fixieren wir aber das letztere, dann ist das Egokoordinatensystem das Bezugssystem, und die scheinbare

Geschwindigkeit ist zu gleichen Teilen verteilt auf den bewegten Körper und die in umgekehrter Richtung hinter ihm vorbeizueilen scheinenden, objektiv ruhenden, Gegenstände.

A. KIRSCHMANN (Leipzig)

424. MARX, H., Unterschiedsschwelle und Resonanztheorie. *Arch. f. Ohren-, Nasen- u. Kehlkopfheilkunde,* 1921, **107**, 49–61.

Sucht zu zeigen, dass die psychologische Aufassung der Unterschiedsschwelle mit der physiologischen Theorie des Hörens, nämlich der Resonanztheorie, in Einklag steht.

O. KLEMM (Leipzig)

425. DOEDERLEIN, W., Ueber die exakte Bestimmung der oberen Hörgrenze mittels der Galtonpfeife. *Beitr. z. Anat., Physiol., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.,* 1921, **17**, 81–100.

Nach einer neuen Anblasemethode werden mit der Galtonpfeife zuverlässige Töne gewonnen, die oberhalb der menschlichen Hörgrenze gelegen sind.

O. KLEMM (Leipzig)

426. GRIESSMANN, B., Neue Methoden zur Hörprüfung. *Beitr. z. Anat., Physiol., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.,* 1921, **16**, 47–55.

Beschreibt ein Otoaudion, in welchem ein Telephon durch Wechselströme erregt wird. Die Wechselströme werden aus einem Schwingungskreise gewonnen, der aus Selbstinduktion und Kapazität besteht. Frerner wird zur Sprachprüfung ein Ototelegraph angegeben, der die Normalsprache zu fixieren gestattet.

O. KLEMM (Leipzig)

427. SCHAEFER, K. L., und GRUSCHKE, B., Ueber einen neuen elektro-akustischen Apparat zur Hörschärfemessung mittels einer kontinuierlichen Tonreihe. *Beitr. z. Anat., Physiol., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.,* 1921, **16**, 56–61.

Vorläufige Mitteilung über einen neuen Hörprüfungsapparat, der auf der Erregung sinusfürmiger elektrischer Schwingungen durch Gasentladungen beruht.

O. KLEMM (Leipzig)

428. Lutz, P., Ueber die Tonbildung in den Lippenpfeifen. *Beitr. z. Anat., Physiol., Pathol. u. Therapie d. Ohres, d. Nase u. Halses.*, 1921, **17**, 1–80.

Bei der Tonbildung in den Lippenpfeifen wirken Schneidentöne und Resonanztöne zusammen. Der "Oktavensprung" ist nur scheinbar. Er ist eine zwangsmässige Unterdrückung des Schneidentones.

O. Klemm (Leipzig)

429. Marx, H., Ueber die Schwelle, besonders die Unterschiedsschwelle bei Schallempfindungen. *Intern. Zentralblatt f. Ohrenheilkunde u. Rhino-Laryngol.*, 1921, **18**, 49–59; 114–126; 185–196.

Der erste Beitrag bringt allgemeines über das Schwellenphänomen und seine Bedeutung für die Psychologie unter Beschränkung auf die ältere Diskussion über die Fechnersche Massformel. Der zweite berichtet über die bisher angewendeten Methoden zur Bestimmung der Unterschiedsschwelle für intensitaten und der Qualitätsschwelle für sukzessive und gleichzeitige Töne. Endlich der dritte beschäftigt sich mit den Ursachen der Schwellen für Schallreize und mit ihrer Bedeutung für das Hören. Die einfache Schwelle sei in der Hauptsache rein physiologisch zu erklären, die Unterschiedsschwelle teils auf physiologische, teils auf psychologische Ursachen zurückzuführen.

O. Klemm (Leipzig)

430. Roehr, H., Ergebnisse experimenteller Schallschädigungsversuche bei Tieren. *Beitr. z. Anat., Physiol., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.*, 1921, **16**, 14–31.

Die Widerstandsfähigkeit gegen experimentelle Schallschädigung ist bei verschiedenen Tieren sehr verschieden. Besonders unempfindlich sind die weisse Maus, und die bisher untersuchten Vögel, mit Ausnahme der Taube. Wichtig ist es, den Versuch mit reinen Pfeifen auszuführen.

O. Klemm (Leipzig)

431. Marx, W., und Marx, H., Ueber die Wahrnehmung der Schallrichtung. *Beitr. z. Anat., Physiol., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.*, 1921, **16**, 32–46.

An eine Mitteilung von Lokalisationsbeobachtungen bei feuernden Geschützen, die der Ausbildung des Schallmessverfahrens voraus-

gingen, schliesst sich ein Ueberblick über die Theorien, der im wesentlichen bei den bis 1914 veröffentlichten stehen bleibt. Es fehlt die Beziehung zu der seitdem bekannt gewordenen Zeitdifferenzentheorie.

O. Klemm (Leipzig)

432. Schaefer, K. L. Das Schwingungszahlengesetz der Galtonpfeife bei konstantem und mittelstarkem Anblasedruck. *Beitr. z. Anat., Physiol., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.*, 1921, **16**, 1–13.

Ermittelt einen algebraischen Ausdruck für das Schwingungszahlengesetz der aus dem Edelmannschen Institut hervorgehenden "einfachen Grenzpfeifen."

O. Klemm (Leipzig)

433. Goebel. Klinische Beobachtungen über die akustische Tätigkeit des Vorhofs. *Arch. f. Ohren-, Nasen- u. Kehlkopfheilkunde,* 1921, **107**, 62–101.

Nimmt die nervösen Organe des Vorhofs auch für akustische Zwecke in Anspruch, nämlich für die Empfindung der höchsten Töne und für die Reibegeräusche. Gegen die herkömmliche Lehre, dass die Otholithenorgane die Träger von statischen Empfindungen seien, werden zahlreiche und ernste Bedenken ins Feld geführt.

O. Klemm (Leipzig)

434. Köllner, H. Die Sehrichtungen. *Arch. f. Augenheilk.*, 1921, **89**, 67–79.

Sorgfältige Untersuchungen der Sehrichtungen bei einigen normalen Personen mit Hülfe der von K. angegebenen haptischen Methode ergaben, dass als Zentrum der Sehrichtungen für das binokulare Sehfeld keineswegs das Cyklopenauge zu gelten hat, wie man bisher irriger Weise nach *Hering* annahm, vielmehr die beiden Augen und ihre Verbindungslinie. Diese Sehrichtungslage gilt sowohl für das binokulare Sehen wie bis das Sehen jedes Auges für sich. Damit bringt K. einen neuen Beweis für die Gültigkeit der Sehrichtungsgemeinschaft beider Augen auch für das monokulare Sehen. Ein Schema der Sehrichtungen ist beigegeben. Diese entsprechen also in beiden Sehfeldhälften meist den Richtungslinien des gleichnamigen Auges.

H. Köllner (Würzburg)

435. GROETHUYSEN, G., Ueber die Beziehungen zwischen motorischer und optischer Unterschiedsempfindlichkeit bei normalen und krankhaften Zuständen des Sehorgans. *Arch. f. Augenheilk.*, 1921, **87**, 152–188; **88**, 83–115.

Die Untersuchungen mit dem neuen Hess'schen Pupilloskop haben ergeben, dass bei Normalen die pupillomotorische und optische Unterschiedsempfindlichkeit für Lichtstärken in ihrem Ausmass gleich sind und dass auch das Alter keinen Einfluss auf die erstere hat. Auch die konsensuelle pupillomotorische Unterschiedsempf. ist der direkten gleich. Refraktionsanomalien, sog. Amblyopia ex anopsia, Linsen-und Glaskörpertrübungen haben auch bei starker Sehstörung auf optische und motorische U-E keinen Einfluss. Bei Aderhaut-und Netzhauterkrankungen können beide ebenfalls trotz starker Sehschärfe-Herabsetzung normal sein. Bei Sehnervenatrophien stehen im Allgemeinen der Grad der Herabsetzung der optischen und motorischen U. -E im Verhältnis zur Sehschärfe-Herabsetzung. Jst die motorische U-E allein gestört, handelt es sich um Erkrankung des Schaltstückes zwischen Sehbahn und Pupillenkern (Tabes).

H. KÖLLNER (Würzburg)

436. KÖLLNER, H., Die haptische Lokalisation der Sehrichtungen, sowie über die Sehrichtungen von Doppelbildern. *Arch. f. Augenheilk.*, 1921, **89**, 121–136.

Die Einwände Lesmanns gegen das Köllnersche Sehrichtungs gesetz werden zurückgewiesen und durch neue Versuche gezeigt, dass die Bestimmung der Sehrichtungen auf haptischem Wege (mit der Hand) befriedigend genau möglich ist. Kontrollen über die Zuverlässigkeit der haptischen Raumorientierung und ihre Uebereinstimmung mit der optischen kassen sich immer vernehmen. Eine rein optische Bestimmung der Sehrichtungen ist überhaupt aussichtslos, da wir die Lage der Augen optisch nicht zu bestimmen vermögen. Auch die Sehrichtungen von Doppelbildern, wie alle anderen neuen Versuche entsprechen dem Köllnerschen Gesetz. Dieses liess sich übrigens schon aus dem Gesetz der identischen Sehrichtungen logisch ableiten, das immer im rechten Sehfelde, die Eindrücke des rechten, im linken die des linken Auges vorherrschen.

H. KÖLLNER (Würzburg)

437. Lohmann, W., Untersuchungen über die optische Breitenlokalisation mit besonderer Berücksichtigung ihrer Beziehungen zur haptischen Lokalisation. *Arch. f. Augenheilk.*, 1921, **89**, 35–53.

L. wendet sich vor allem gegen das Gesetz der Sehrichtungen Köllners und sucht die Befunde durch Besonderheiten der haptischen Lokalisation zu erklären, mit deren Hilfe K. die Sehrichtungen vermittelte. Jm haptischen Raume haben die rechte und linke Hand besonderen Einfluss. Beide werden nicht, wie beim Sehorgan die beiden Augen, zu einer einheitlichen Empfindung verschmolzen, sondern behalten ihre Selbständigkeit Daber ergeben sich bei der Vergleichung optischer und haptischen Daten individuelle Schwankungen, bei denen teils die rechte, teils die linke Hand vorherrscht. Auch die binokulare Medianebene fällt bei haptischer Prüfung nicht immer mit der Körpermedian zusammen.

H. Köllner (Würzburg)

438. Kirsch, R., Sehschärfeuntersuchungen mit Hülfe des Visometers von Zeiss. *Arch. f. Ophthal.*, 1920, **103**, 252.

Der Apparat gestattet eine stetige Grössenänderung des Sehobjektes bei gleichbleibenden Abständen vom Auge. Vergleichsuntersuchungen zwischen Nah- und Fernsehschärfe, also mit und ohne Akkommodation, ergabem, dass die erstere merklich geringer ist im Verhältnis 0, 88:1, 0. Als Sehobjekt wurde eine Fleckprobe verwendet mit einer die Aufmerksamkeit auf sich lenkenden schwarzen Scheibe, welche als eigentliches Sehzeichen weisse Punkte trug. Eine Verkleichung von Druckschriften (Fraktur, Antiqua und Offenbacher Schwabacher) ergab zunächst, dass der Abstand der Buchstaben ein verschiedener war und dass dadurch die Lesbarkeit beeinflusst wurde. Es war infolgedessen eine Umrechnung notwendig. Die Antiqua war um 8% hinsichtlich der Lesbarkeit unterlegen.

H. Köllner (Würzburg)

439. Trendelenburg, W., 2. Mitteilung über den Apparat zur Augenabstandmessung. *Klin. Monatsbl. f. Augenh.*, 1921, **66**, 859–861.

Die Augen des Patienten spiegeln sich in einem unter 45° stehenden halbversilbersen Spiegel. Ein verschiebbarer Mass-stab wird an die Stelle des Raumbildes der Augen hinter dem Spiegel

gebracht und hier der Abstand direkt abgelesen. Der handliche Apparat kann bei Tageslicht benutzt werden.

H. Köllner (Würzburg)

440. Vogt, A., Die Reflexion der Netzhautvorderflächen im rotfreien Licht. Praeretinale Fältchenbildung. *Klin. Monatsbl. f. Augenh.*, 1921, **66**, 838–859.

Im rotfreien Licht tritt eine stärkere Reflexion der Netzhaut hervor, einmal infolge Ueberwiegens der kurzwelligen Strahlen, sodann infolge Fehlens des verschleiernden Aderhautlichtes. Zu den normalen Reflexen gehören ausser den bekannten flächenhaften fetzigen und den Ringreflexen auch eine feine vertikale Reflexlinienbildung in den Augen jugendlicher Personen. Sie unterscheidet sich von pathologischen Reflexen stets durch ihre Feinheit und ihren Verlauf. Pathologisch sind dagegen praeretinale Reflexdoppellinien, die durch Fältchenbildung zustande kommen. Beschreibung mehrerer Fälle mit entsprechender anatomischer Untersuchung.

H. Köllner (Würzburg)

441. Simon, G., Ueber das physiologische relative Skotom innerhalb der Rotgrenzen. *Klin. Monatsbl. f. Augenh.*, 1921, **67**, 41–53.

Bei allen untersuchten Augen fanden sich bei zirkulärer Objektführung im Gesichtsfelde relative Farbenskotome in der oberen Gesichtsfeldhälfte. Für die Grösse des Skotoms erwiesen sich vor allem von Einfluss Exophthalmus und Höhe der Orbita, wahrscheinlich auch der Pigmentgehalt des Auges. Ueber Einfluss von Alter und Beschäftigung der Untersuchten konnte kein Anhaltspunkt gewonnen werden. Die Ursache ist wohl sicher in einer Blendung durch diffuses Himmelslicht zu suchen; es handelt sich also um den gleichen Vorgang wie bei den von anderer Seite mehrfach gefundenen Blendungsskotomen bei Fliegern usw. Man darf eine übermässige Jnanspruchnahme der Sehsinnsubstanzen Herings (Assimilationsstörung) annehmen.

H. Köllner (Würzburg)

442. Holth, S., Meine Drei-Objekten-Probe für zentrales Farbenskotom—auch bei Rotgrünblinden oder anderen Farbenabnormen. *Klin. Monatsbl. f. Aug.*, 1921, **67**, 166–171.

Zum schnellen Nachweis zentraler Farbenskotome wird ein stab mit drei nebeneinanderliegenden Objekten empfohlen, von denen bei

einem Farbenskotom das mittlere nicht erkannt wird. Als Farbenproben sind die Terimeterobjekte von Engelking und Eckstein Rot, Gelb, Grün und Blau gewählt. Bei einem anderen Modell sind auf einem grünen Karton die 4 Terimeterobjekte untereinander in Gestalt dreier nebeneinander befindlicher 1 cm. grosser Scheibchen aufgeklebt, auf der Rückseite ausserdem noch weisse und grössere hochrote Scheiben für stärkere Farbensinnstörungen.

H. Köllner (Würzburg)

443. Lohmann, W., Untersuchungen über die absolute Tiefenlokalisation. *Arch. f. Augenheilk.*, 1921, **88**, 16–31.

Während die relative Tiefenlokalisation an die Disparation der Netzhäute gebunden ist, kommen für die absolute mehrere Faktoren in Betracht (z. B. die scheinbare Grösse), während die Guerdisparation eine relative geringe Rolle spielt. Keinesfalls sei die Annahme Hillebrands richtig, dass die absolute Tiefenlokalisation nur ein Spezialfall der relativen sei: Beide, absolute und relative Tiefenlokalisation, sind auch klinisch und bei Gutachten zu trennen. Beim Tragen von Brillen ergaben sich habituelle Aenderungen der Lokalisation (mehrfach von anderer Seite studiert, sog. porrhallaklische Störungen, Reg.). Bei der haptischen Tiefenlokalisation treten eigentümliche Stauungen unbekannter Natur auf, wie denn überhaupt die Beziehungen zwischen optischer und haptischer Lokalisation noch interessante Fragen offen lassen.

H. Köllner (Würzburg)

444. Köllner, H., Klinische Prüfung der Richtungslokalisation im peripheren Sehen, ihre Ergebnisse bei Einäugigen, sowie über die phylogenetische Bedeutung des Lokalisationsgesetzes. *Arch. f. Augenheilk,* 1921, **88**, 117–138.

Die Richtungslokalisation findet nur für die Umgebung des Fixierpunktes entsprechend dem sogenannten Cyklopenauge statt, in der Gesichtsfeldperipherie lokalisiert jedes Auge in der temporalen Hälfte entsprechend den Richtungslinien, in der nasalen dahgegen so, als wenn das Objekt sich auf der Netzhaut des anderen nicht mitsehenden Auges abgebildet hätte. Die Prüfung geschieht an einem Apparat, bei welchem über ein Brett hinweg beobachtet wird, während die Hand, ungesehen, auf einer Tafel, die Richtung markiert. Diese normale binokulare Lokalisationsweise verliert sich bei Einäugigen erst nach mehreren Jahren (4 oder länger) und macht dann einer rein monokularen Platz. Phylogenetisch ergibt

sich, dass auch beim Menschen noch keine vollkommene verschmelzung der beidäugigen Seheindrücke vorhanden ist, vielmehr noch vieles an eine frühere Totalkreuzung der Sehnerven erinnert.

H. Köllner (Würzburg)

445. Lohmann, W., Zur Genese der akkommodativen Mikropsie und Makropsie. *Arch. f. Augenheilk.*, 1921, **88**, 149–154.

Der Versuch *Essers,* die Erklärung der akkommodativen Mikropsie und Makropsie in der Wölbungsänderung der Augenlinse zu suchen und sie mit den Grössenveränderungen zu vergleichen, wie sie beim Vorsetzen von Konkav- und Konvex-gläsern vor das Auge stattfinden, wird zurückgewiesen. Seine Versuche bei einseitigem Akkommodationskrampf durch Eserin zeigen, dass eine derartige physikalische Erklärung nicht ausschlaggebend sein kann. Vielmehr ist die Ursache in dem subjektiven Teil der für die scheinbare Grösse eines Gegenstandes massgebenden Faktoren zu suchen, wie man ja bisher auch immer angenommen hatte.

H. Köllner (Würzburg)

446. Radojewit, S., Die Erkennbarkeit von Antiqua- und Frakturbuchstaben im indirekten Sehen. *Arch. f. Augenheilk,* 1921, **88**, 186–197.

Zowohl die Majuskeln wie die Minuskeln sind bei der Antiqua im peripheren Sehen ihres einfachen geometrischen Baues wegen leichter zu erkennen, wie bei der Frakturschrift; sie geben weniger zur Verwechslung Veranlassung. Aber durch diese Feststellung soll die Frage, welche der beiden Schriften die bessere Lesbarkeit besitzt, keinesfalls entschieden werden; denn die Lesbarkeit ganzer Worte hängt von ganz anderen physiologischen und psychologischen Momenten ab. Hier ist vielleicht die Frakturschrift der Antiqua wegen der wechselreichen Form der Lettern überlegen. R. will hier nur die Erkennbarkeit der Einzelzeichen berücksichtigen.

H. Köllner (Würzburg)

447. Pulfrich, C., Ueber eine neue Art der Verwendung der Stereoskopie für die Zwecke der isochromen und heterochromen Photometrie. *Sitzungsber d. deutsch. physikal. Gesellschaft u. d. Gesellsch. f. Techn. Physik.*, 1921.

Bewegt man vor einem hellen Hintergrund einen Stab senkrecht zur Blickrichtung, so scheint er sich nur dann gradlinig zu bewegen, wenn die Helligkeiten für beide Augen gleich sind. Andernfalls tritt

ein stereoskopischer Scheineffekt auf, indem sich der Stab im Kreise zu bewegen scheint. Die Ursache beruht darauf, dass die Zeit zwischen Reiz und Empfindung mit abnehmender Helligkeit grösser wird. Nach diesem Prinzip baute P. nun Stereophotometer, wobei die Einstellung auf Gradlinigkeit der Bewegung als Indikator dient. Ein Stereospektralphotometer gestattet auf diesem Wege die Helligkeit der einzelnen Spektralfarben bezw. die Helligkeitsverteilung im Spektrum leicht messend zu bestimmen.

H. Köllner (Würzburg)

448. Hanssen, R., Zur Genese der Myopie. *Klin. Monatsbl. f. Aug.*, 1921, **67**, 171–172.

Vor allem Levinsohn hatte die Ueberdehnung der Sklera in der hinteren Bulbushälfte bei der Kurzsichtigkeit auf eine Zerrung des Sehnerven an den Augen zurückführen wollen. H. konnte nun einen Fall von hochgradiger Myopie anatomisch untersuchen: er fand, dass der vergrösserte Bulbus zu einer sehr starken S-förmigen Krümmung des Sehnerven geführt hatte, derart, dass von einer Zerrung durch diesen keine Rede sein konnte; vielmehr war der Nerv offensichtlich durch das Auge nach hinten gedrängt worden. Die Levinsche Theorie der Myopiegenese ist also irrig.

H. Köllner (Würzburg)

449. Hansen, K., Die Unterschiedsschwellen des Drucksinnes bei möglichst verhinderter Reizausbreitung. *Zeits. f. Biol.*, 1921, **73**, 167–190.

Stratton hat schon darauf hingewiesen, dass Gewichtsvermehrung nicht nur eine Zunahme der Wirkung auf die von vorn herein getroffenen Sinneselemente bedingt, sondern auch durch die Deformation der Haut auf eine grössere Zahl wirkt. Im gleichen Sinne sprechen die Untersuchungen von v. Frey an Hautstellen mit geschädigter Innervation. Stratton fand das Webersche Gesetz innerhalb gewisser Grenzen für der Drucksinn giltig, er ist der Meinung dass die Ausbreitung der Deformation eine geringe Bedeutung hat. Hansen untersucht nach dem Verfahren der Ankerhebel von v. Frey die Wirkung verschiedener Druckreize auf ein einzelnes Sinneselement mit völliger Ausschaltung des Übergreifens. Da dies auf der normalen Haut nicht ohne weiteres angängig ist, so zerstötte er bei einer Vp, die auf einer Hautstelle des Oberschenkels schon eine verminderte Zahl der Druckpunkte hatte, alle Druckpunkte bis auf einen leicht ansprechenden zentral gelegenen in einer

Fläche von 12 qcm. Bei solchen Verhaltnissen konnte der einzelne Druckpunkt mit Reizen bis zu 8, 5 g belastet werden ohne dass die Umgebung durch Deformation ansprach. Es ergab sich bei den verschiedenartigen Versuchen, dass das Webersche Gesetz in keinem Falle galt. Wenn Stratton dies giltig gefunden hatte, so beruht das auf extensiver Reizung. Die Unterschiedsempfindlichkeit nimmt mit zunehmendem Reize merkwürdigerweise ab, und zwar sehr deutlich. Die Unterschiedsschwellen liegen bei einem einzelnen Druckpunkte zwischen 56 und 20% je nach der Reizstärke. Ein einzelnes Nervenendorgan ist sehr wohl imstande, verschiedene Stärken des Druckes zu übermitteln; es gilt hier also das Alles oder Nichts Gesetz nicht.

P. Hoffmann (Würzburg)

450. Hofmann, F. B., Zur Theorie des Geruchssinnes. I Parosmie Studien. *Zeits. f. Biol.*, 1921, **73**, 29–66.

Sehr eingehende Studien über die Geruchsstörung, die sich beim erf nach einen Katharrh einstellte. Anfangs fast völliger Verlust des Geruchs. Deutliche qualitative Veranderungen der Gerüche. Es müssen durch die meisten Riechstoffe mehrere periphere Empfangsampparate gereizt werden. Es wurde während der Untersuchung noch ein zweiter Fall einer derartigen Störung gefunden (bei einem Chemiker). Die Zahlreichen sehr wichtigen Einzelbeobachtungen sind nicht in einem kurzen Referat zu vereinigen.

P. Hoffmann (Würzburg)

451. Frey, M. v., Über die sog. Empfindung des leeren Raumes. *Zeits. f. Biol.*, 1921, **73**, 263–266.

Von F. Schumann ist eine eigentümliche Erfüllung des Raumes in stereoskopischen Bildern beschrieben worden. Betrachtet man von der gleichen photographischen blatte gemachte Abzüge mit dem Stereoskop, so beobachtet man (1) Der dargestellte Gegenstand erscheint grösser. (2) Matte Flächen werden mehr oder weniger glänzend, der Glanz der glatten wird verstärkt. (3) der Raum erscheint mit feinem Staub erfüllt. Dies ist darauf zu beziehen, dass die Maxima und Minima der Helligkeit, die durch das Papierkorn erzeugt werden, in beiden Augen auf disparate Stellen fallen. Dieser Staub bewirkt die Luftperspektive bei den Stereoskopen. Zur Annahme einer besonderen Empfindung ist kein Grund gegeben.

P. Hoffmann (Würzburg)

452. Ruediger, W. C., Local Signature and Sensational Extensity. *J. of Exper. Psychol.*, 1921, **4**, 469–474.

Of the various theories aiming to account for local signs, two seem especially worthy of consideration: the sensory-complex theory, according to which sensations from spatial modalities are all respectively alike, but combine to give differences in local signs; and the sensory-element theory, which postulates a slight difference in every sensation by means of which associations of specific location are formed. In the present article reports are made of experiments in which 1 gr. and 10 gr. pressures were applied in one series to a conspicuous vein, and in another to a portion of the skin where no vein was in evidence. Localization of pressure was more accurate on a vein where the subcutaneous tissue is uniform than on other parts of the skin; and the weak stimuli were localized slightly more accurately than the strong. Both of these results would seem to argue against the complex theory and for the sensation-element theory: differences inhere in the elementary qualities of sensation and give rise to awarenesses of location; these minute differences, when combined in perceptual patterns, form the basis for awareness of size and extent.

C. C. Pratt (Clark)

453. Warren, H. C., Some Unusual Visual After-effects. *Psychol. Rev.*, 1921, **28**, 453–464.

The writer describes several delayed after-sensations, a prolonged after-sensation of glare, and a number of early and recent experiences of voluntary visualization. The phenomena described are brought into relation with those reported by Urbantschitsch, Burch, Jaensch, and Busse. The question is raised as to whether the origin of these effects is peripheral or central. Three classes of visual after-effects are distinguished: (1) pure after-sensations; (2) mixed after-effects; (3) pure visualization.

P. T. Young (Illinois)

454. Tolman, E. C., Concerning the Sensation Quality: A Behavioristic Account. *Psychol. Rev.*, 1922, **29**, 140–146.

The writer distinguishes between the sensation quality ("raw feel" or "quale") and the behavior equivalent ("term-character"). There is no way of knowing whether your qualia are the same as mine. "All that gets into our psychology, whether we call it

behaviorism or whether we call it introspectionism, is not the qualia, themselves, but merely their term characters; *i.e.*, the *behavior potentialities* of those qualia."

P. T. Young (Illinois)

4. FEELING AND EMOTION

455. Allport, F. H., A Physiological-Genetic Theory of Feeling and Emotion. *Psychol. Rev.*, 1922, **29**, 132–140.

(1) The physiological antagonism between the sympathetic division and the craniosacral divisions of the autonomic nervous system furnishes a bodily basis for the antagonism between pleasantness and unpleasantness. The bodily changes regulated by the sympathetic, which were studied by Cannon, occur during unpleasant experiences. The cranial and sacral divisions regulate the food-taking and sex functions, predominately pleasant experiences. (2) In addition to the affective components emotions contain differentiating factors. Differentiation may be referred to the afferent impulses arising from the somatic responses. (3) The theory is "sustained by certain facts of genetic development," especially by the fact that the "emotional states of the new-born babe appear to be undifferentiated." The cerebrospinal reactions, which develop later, contribute the differentia of emotions. (4) The "neural conditions for the arousal of unpleasant emotion" are "those which help in breaking through the high resistance of the sympathetic and sending inhibitory impulses to the smooth muscle." (5) The theory does not exclude "the possibility of characteristic cortical processes in emotional and affective states."

P. T. Young (Illinois)

5. MOTOR PHENOMENA AND ACTION

456. Kahn, R. H., Beiträge zur Lehre vom Muskeltonus. II. (Zustand und innervation der Muskeln der vorderen Extremitäten des Frosches während der Umklammerung). *Arch. f. d. ges. Physiol.*, 1921, **192**, 93–114.

Die von de Boer aufgestellte Lehre, dass der Muskeltonus durch eine sympathische Innervation hervorgerufen wird, prüft Kahu an dem sehr geigneten Objekt des männlichen Froschs während der Umklammerung, wo tagelang ein starker Tonus der vorderen Extremitäten vorhanden ist. Mit einem genauer beschriebenen Verfahren werden die sämmtlichen sympathischen Nerven der einen

vorderen Extremität durchschnitten. Ein Unterschied im Tonus beider Seiten tritt nicht zu Tage. Der Verfässer lehnt daher für sein Objekt die de Boer'sche Hypothese ab. (Vergiftungsversuche mit sympathischen und parasympathischen Giften gaben kein klares Resultat.) Ferner ergänzt Kahn seine schon früher beschriebene Feststellung, dass beim Umklammerungstonus keine Aktionsströme ableitbar sind, dahin, dass solche sofort auftreten, wenn man versucht, die Umklammerung mit Gewalt au Jösen.

BETHE (Frankfurt a/M.)

457. ROSENBERG, H., Über den Polaren Einfluss des Konstanten Stromes auf die Erregbarkeit des isolierten Froschherzens. *Zeits. f. Biol.*, 1921, **72**, 51–88.

Bei Schliessung und Öffnung des konstanten Stroms folgt das Herz dem polaren Erregungsgesetz. Abfall der Anspruchsfähigkeit an der Anode, Steigerung an der Kathode. Der umgekehrte Einfluss der Stromöffnung lässt sich ebenfalls nachweisen.

P. HOFFMANN (Würzburg)

458. TRENDELENBURG, W., Ein Einfaches Verfahren für Gasnanalysen zu physiologischen Zwecken. *Zeits. f. Biol.*, 1921, **72**, 141–162.

Beschreibung einer einfachen doch ziemlich genauen Methodik die sich besonders auch für die pazrktischen Übungen der Studierenden eigent.

P. HOFFMANN (Würzburg)

459. LÜSCHER, E., Gaswechsel und meschanische Leistung des Froschherzens. *Zeits. f. Biol.*, 1921, **72**, 107–128.

Untersuchung des Gaswechsels des troschherzens bei Überlastungszuckungen nach einer Methode, die der von Weizsäcker entwickelten sehr ähnlich ist.

P. HOFFMANN (Würzburg)

460. HOFFMANN, P., Über die Beziehungen der Hautreflexe zu den Sehnenreflexen. Eigenreflexe und Fremdreflexe der Muskeln. Ein Vergleich der Eigenschaften beider auf Grund eigener Untersuchungen. *Zeits. f. Biol.*, 1921, **72**, 101–106.

Die Eigenreflexe, oder wie man sie gemeinhin benennt: Sehnenreflexe, zeigen ganz andere Eigenschaften als die Fremdreflexe. Sie haben eine konstante Reflexzeit, Summation des Reizes tritt nicht

ein, die Reflexe sind segmental und halbseitig beschrankt, sie werden sehr schwer ermüdet, sie sind unbewusst. Die Fremdreflexe verhalten sich in diesen Eigenheiten entgegengesetzt. Sie haben eine lange, nicht konstante Reflexzeit, Summation des Reizes ist ganz gewöhnlich, ein Übergreifen auf andere Segmente ist stets zu bemerken, es tritt serzh rasch Gewöhnung bezw. Ermüdung ein. Es ist also notwendig, diese beiden Arten der Funktion des Rückenmarks scharf zu trennen.

P. Hoffmann (Würzburg)

461. Ackermann, D., und Kutscher, F., Über einige methylierte Aminosäuren und methylierte Aporrhegmen sowie ihr Verhalten im Tierkörper. *Zeits. f. Biol.*, 1921, **72**, 177–186.

Die Methylierungsprodukte zeigen gegenüber den abbauenden Kräften des Organismus grosse Widerstandsfähigkeit.

P. Hoffmann (Würzburg)

462. Dennig, H., Über die zeitliche Beziehung zwischen Refraktärphase und Kontraktionsablauf des Herzens. *Zeits. f. Biol.*, 1921, **72**, 187–202.

Refraktäre Phase und Kontraktionszustand des Herzens sind nicht fest mit einander verbunden.

P. Hoffmann (Würzburg)

463. Dittler, R., Studien zur Physiologie der Befruchtung. I. Die Sterilisierung des weiblichen Tierkörpers durch parenterale Spermazufuhr. *Zeits. f. Biol.*, 1921, **72**, 305–336.

Es gelingt Kaninchen durch Injektion von Sperma befruchtungsunfähig zu machen (für einige Monate).

P. Hoffmann (Würzburg)

464. Haberlandt, L., Über Trennung der intrakardialen Vagusfunktion von der motorischen Leistung des Froschherzens. II. Mitteilung Versuche über Wasser und Wärmewirkung. *Zeits. f. Biol.*, 1921, **72**, 163–176.

An Froschherzen, die aus Wasser oder Wärmestarre durch Blutdurchströumung wiederbelebt worden sind, kann der gesamte intrakardiale Vagusapparat dauernd oder vorübergehen ausgeschaltet sein.

P. Hoffmann (Würzburg)

465. Hofmann, F. B., Die Ursache des Stillstandes nach der ersten Stanniusschen Ligatur. *Zeits. f. Biol.*, 1921, **72**, 229–257.

Am Zustandekommen des Stillstandes nach der ersten Stanniusschen Ligatur ist eine Reizung der intrakardialen Hemmungsnerven nicht wesentlich beteiligt.

P. Hoffmann (Würzburg)

466. Hofmann, F. B., Über das Erwachen eigener Tätigkeit in Funktionell abhängigen Organen nach der Lösung ihres physiologischen Zusammenhanges mit den Über geordneten Zentren. *Zeits. f. Biol.*, 1921, **72**, 258–272.

Solche Vorgänge sind, Ventrikel des Foschherzens, Flimmerplättchen der Rippenquallen, spinale Zentren der Wirbeltiere, quergestreiften Skelettmuskel, glatte Muskulatur, Speicheldrüsen. Es ist anzunehmen, dass die Erregbarkeit der Gewebe allmälich so hoch steigt, dass innere Reize wirksam werden.

P. Hoffmann (Würzburg)

467. Kestner, O., Die Wirkung der Strahlung auf den Blutdruck. *Zeits. f. Biol.*, 1921, **73**, 7.

Die von der Bogenlampe abgesaugte Luft setzt den Blutdruck herab. Damit dürfte für die merkwürdige physiologische Wirkung der Schwüle eine Grundlage gewonnen sein.

P. Hoffmann (Würzburg)

468. Hahn, A., und Michalik, R., Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. *Zeits. f. Biol.*, 1921, **73**, 10–18.

Optimum der Wirkung der Pankreasdiastase bei Phosphat- und Acetatpufferlösungen.

P. Hoffmann (Würzburg)

469. Sheng, C., und Schilf, E., Über eine aussergewöhnlich lange Zuchungskurve eines quergestreiften Muskels. *Zeits. f. Biol.*, 1921, **73**, 117–122.

Beschreibung am Krebsmagenmuskel.

P. Hoffmann (Würzburg)

470. Lüscher, E., Gaswechsel und mechanische Leistung des Froschherzens. *Zeits. f. Biol.*, 1921, **73**, 67–72.

Berechnungen über die Leistung des Herzens beim Schlagen, Messung des Gaswechsels nach der von v. Weizsäcker angegebenen Methode.

P. Hoffmann (Würzburg)

471. Mayer, C., Physiologisches und Pathologisches über das Gähnen. *Zeits. f. Biol.*, 1921, **73**, 101–114.

Selbstbeobachtungen und Literaturstudium über das Gähnen.

P. Hoffmann (Würzburg)

472. Hoffmann, P., Lassen sich im quergestreiften Muskel des Normalen Erscheinungen nachweisen, die auf innere Sperrung deuten. *Zeits. f. Biol.*, 1921, **73**, 247–262.

Es werden keine derartigen gefunden und deshalb die Annahme einer dualistischen Funktion abgelehnt.

P. Hoffmann (Würzburg)

473. Hansen, K., Beobachtungen über die Wirkung des Kalziumentzugs am überlebenden Froschherz. *Zeits. f. Biol.*, 1921, **73**, 191–204.

Eignet sich nicht zür kürzen Besprechung.

P. Hoffmann (Würzburg)

474. Beuchelt, H., Die Abhängigkeit der Photoelektrischen Reaktion des Froschauges von den ableitenden Medien. *Zeits. f. Biol.*, 1921, **73**, 205.

Die Tiere werden von der Aorta aus mit verschiedenen Lösungen durchströmt. Die verschiedenen Salze verändern die Stromform ausserordentlich.

P. Hoffmann (Würzburg)

475. Plattner, F., Über die Abhängigkeit der Erregungsgrösse von der Reizdauer bei einem Rückenmarksreflex des Frosches. *Zeits. f. Biol.*, 1921, **73**, 267–276.

Eignet sich nicht zum kürzen Referat.

P. Hoffmann (Würzburg)

476. LANGELÜDDEKE, A., Die Schwankungen der Arbeitskurve bei Normalen und Gehirnverletzten. *Zeits. f. d. ges. Neurol. u. Psychol.*, 1920, **58**, 216–265.

Prüfung mit Hilfe des fortlaufenden Addierens. Die Auswertung der aufgenommenen Kurven ergibt, dass die Leistungsfähigkeit der Gehinrverletzten Gesunden gegenüber erheblich herabgesetzt war während bei Gesunden nur 4,5% einen Zentralwert grösser als 4,0 Sekun, den für eine Addition hatten, waren es bei reinen Gehirnverletzten 28%–, bei psychogen komplizierten 40%. Gesunde machten in der ersten Halbstunde zwischen 10 und 73 Additionen in der Minute, Hirnverletzte zwischen 7 und 88. Die Ermüdbarkeit war bei Hirnverletzten im allgemeinen gesteigert. Die Kurvenschwankungen waren bei einem Teil der Hirnverletzten vergrössert, bei einem anderen Teil verkleinert; bei den psychogen komplizierten Fällen waren sie in 40% verkleinert, in keinem Fall vergrössert. Die Hirnverletzten mit geringer Leistung und mit abnorm kleinen Kurvenschwankungen waren überwiegend Stirnhirnverletzte. Die abnorm geringen Schwankungen werden mit einer psychischen Hemmung erklärt, die kräftigere Willensanspannung nicht zulässt und durch die die Ablenkbarkeit vermindert ist. Die vergrösserten Kurvenschwankungen werden durch erhohte Ermüdbarkeit und gesteigerte Ablenkbarkeit der Aufmerksamkeit verursacht. Bei den durch letztere bedingten Vergrösserungen der Kurvenschwankungen überwogen etwas die Scheitelhirnverletzungen.

STEINER (Heidelberg)

477. GIESE, F., Das psychologische Uebungszimmer. *Zeits. f. d. ges. Neurol. u. Psychol.*, 1920, **58**, 133–215.

Ausführliche Beschreibung teils bekannter, teils modikizierter psychotechnischer und psychophysiologischer Apparaturen und Versuche zum Zwecke diagnostischer und psychotherapeutischer Anwendung.

STEINER (Heidelberg)

478. CARR, H., The Influence of Visual Guidance in Maze Learning. *J. of Exper. Psychol.*, 1921, **4**, 399–417.

For this experiment a stylus maze was constructed so that to the eye all possible paths seemed to lead without obstruction from the starting point to the finish, whereas in reality all paths but one were blocked by invisible stops. The subject, therefore, was unable to distinguish visually between the true path and the *cul de sacs*.

In the first part of the experiment one group of subjects was permitted one minute for a visual inspection of the maze before beginning trials with the maze screened from view; groups ii, iii, iv, and v were allowed to see the maze during one, two, three, and five trials, respectively, at the beginning of the series; while group vi learned the maze entirely without the coöperation of sight. The data from the last group were used as norms of comparison. In subsequent parts of the experiment variations in the kinds of visual guidance were introduced. For one group, *e.g.,* visual guidance was introduced during the fifth and sixth trials, and for another group during the ninth and tenth trials. Other groups worked with the aid of maps which showed the paths and *cul de sacs.* Comparisons were also made with the results of two subjects totally blind from birth.

Visual control is uniformly more effective in eliminating errors than in reducing the number of trials. Preliminary visual inspection is detrimental when measured in terms of trials, but is beneficial in reducing the number of errors. Trials with visual guidance are extremely effective in reducing the amount of error: three and five trials are more effective than one and two trials, although relatively the latter constitute the more efficacious periods of visual learning. The introspective results also show that visual memory operates advantageously during those trials in which the maze is not seen. In general, the earlier the introduction of visual guidance, the greater is its effect upon the error score. Indirect visual cues, such as those derived from maps, tend to eliminate error, especially when the map enabled the subject to determine the true path. The scores for trials of the two blind subjects exceed the average range of normal variability, but lie within the maximal range. The error and time values, however, exceed considerably the maximal range of variability. The results as a whole indicate that visual modes of control are much more effective in the acquisition and performance of acts of skill than hitherto suspected.

C. C. Pratt (Clark)

479. Barton, J. W., Smaller *vs.* Larger Units in Learning the Maze. *J. of Exper. Psychol.,* 1921, **4**, 418–429.

This experiment was undertaken in an attempt to throw some new light on the problem of whole *versus* part learning. Three groups of eleven subjects were given the task while blindfolded of manoeuvring a penholder through the true path of a grooved maze

containing 31 *cul de sacs*. The first group took the maze as a whole; the second "part continuous" group started with the first quarter of the maze as a unit of learning and added another quarter as soon as the previous unit was learned; and the third group learned each quarter of the maze separately in regular order. The results show very clearly that the "part" methods are superior to the "whole" method of learning, both for elimination of errors and for saving of time. This superiority of the "part" methods is probably explained on the basis of neural transfer: when in two or more situations of response identity of neural factors is involved transfer seems to be facilitated.

C. C. Pratt (Clark)

6. ATTENTION, MEMORY AND THOUGHT

480. Mead, G. H., A Behavioristic Account of the Significant Symbol. *J. of Philos.*, 1922, **19**, 157–163.

The significance of the significant symbol in terms of behavioristic psychology is this in summary: Not only is the nature of the object indicated to the behaving organism, but such behavior which we call a "gesture" falls within the range of other individuals, and this indicates meaning, for when we have succeeded in making adjustment to a set of reactions we feel that "the meaning" of the object so stimulating us is part of us. From such particular situations we proceed to universals and have meanings of universal significance. One comes to see himself as the group sees him, and this placing of ourselves "in each other's rôles" brings just that value "connoted" by the word significance.

T. R. Garth (Texas)

481. Flournoy, T., L'Idee centrale de la Critique de la Raison Pure. *Arch. de psychol.*, 1921, **18**, 126–134.

A posthumous publication of an unfinished paper, in exposition of Kant's immortal Critique, begun by Flournoy in 1884 or 1885, edited by A. Reymond, of the University of Neuchâtel.

H. R. Crosland (Oregon)

482. Wheeler, R. H., and Cutsforth, T. D., The Rôle of Synaesthesia in Learning. *J. of Exper. Psychol.*, 1921, **4**, 448–468.

The purpose of the present investigation was to discover the mental contents and functions employed in learning by the blind

synaesthetic subject, *A*, whom Professor Wheeler has already described elsewhere. A second blind, but asynaesthetic subject, *B*, was used for purposes of control and comparison. Both subjects were well trained in introspection. Two sets of nonsense syllables, one for tactual and one for auditory presentation, were given the subjects to memorize for an immediate and a twenty-four-hour delayed recall. *A's* introspective data bear witness to the prevalence of synaesthetic phenomena in his mode of learning. For retention and recall, regardless of the manner of presentation, he relied on visual schemata in which each syllable assumed under optimal conditions a definite place and color. Vocimotor-auditory imagery was used either merely for verbalization, or to arouse and strengthen certain colors when at times it was difficult to bring a mass of unclear dissociated colors into the pattern adequate to touching off a response in line with the *Aufgabe*. *A's* synaesthetic phenomena seemed to act somewhat like a kind of reversible conditioned reflex: at one time the stereotyped response to the parent perceptual process, at another, the stimulus for the arousal of the parent process. A comparison of *A's* introspections with those of *B* reveals the fact that differences occurred only in the type of mental content. Learning was similar for both subjects as far as its functional aspect was concerned. Such functions as attention, voluntary control, retention, anticipation, recall, association, the use of schemata, and the like, operated in identical manner in the two subjects.

C. C. Pratt (Clark)

483. Conger, G. P., The Implicit Duality of Thinking. *J. of Philos.*, 1922, **19**, 225–228.

It is strange that such a plain fact of psychology as duality, illustrated in the attention process, perception, etc., should have been underestimated by the logicians and the metaphysicians. Thinking can be considered as an instance of inhibition of processes by others antagonistic to it. In fact, the more highly developed language reactions are found to be in keeping with the principle of duality.

The discussions of the infinite implying duality may be more clearly given if stated in terms of psychology rather than of logic.

Thinking proceeds by various forms of conflict, inhibitions, etc. The mind is a marvellous kaleidoscope. There must be some more direct way, some might think, to reality than by the road of reason.

T. R. Garth (Texas)

484. KANTOR, J. R., Association as a Fundamental Process of Objective Psychology. *Psychol. Rev.*, 1921, **28**, 385–425.

The section headings of Dr. Kantor's paper are as follows: (1) The problem and nature of association. (2) The basic roots of associational processes. (3) What are associated? *A*. The simple associates (associations of stimuli and responses; associations of stimuli and stimuli; associations of settings and stimuli; associations of settings and reactions; associations of settings and settings; associations of reactions and reactions). *B*. Complex associations. (4) How associations are organized (stimuli and responses; stimuli and stimuli; responses and responses; stimuli and settings; responses and settings; settings and settings). (5) The operation of association processes (the mechanism of association in manual skill; the mechanism of association in memory; the mechanism of association in imagination; the mechanism of association in thinking). (6) The modes of psychological association (primary and secondary association; temporary and inseparable association; original and formed associations; logical and conventional association; direct and indirect association). (7) Levels of associative formation. (8) General conditions of association. (9) Psychological association and the neuronic theory. (10) Summary.

P. T. YOUNG (Illinois)

485. BOODIN, J. E., Sensation, Imagination and Consciousness. *Psychol. Rev.*, 1921, **28**, 425–453.

In psychology as well as other sciences the fundamental concepts are undergoing important changes. The work of Dr. Henry Head upon cutaneous sensation has modified our beliefs regarding the nature of sense qualities and their neural bases, disproving the validity of the old subjectivistic interpretation. Dr. Head's work has also shown that the facts of selection and integration can be stated in purely physiological terms.

Constructive imagination, like sensation, may be interpreted physiologically. "We may hold, I think, that the imaginative patterns in the cortex are connected by lines of motion, centrifugal as well as centripetal, with the sense organs of the body; that what is stored is not content but lines of motion, thus connecting the meaning patterns with the parts of the body; that imaginative revival means that these energy patterns are brought into play and communicate their motion outward to the sense organs, which, if the excitement is sufficient to overcome their inertia, respond by sending sense impulses

to the cortex." The importance of images has been overrated by traditional psychology. All content is sensational and exists only in the degree that the senses are active.

Some fundamental neural functions are selection, suppression, integration, and projection. These functions are found at all levels. Consciousness is not an explanatory category. "So long as we limit ourselves to the individual organism and its implications, we can project all our facts on one plane, viz., that of physiology, even though we are under the necessity of borrowing some of the terms that have been associated with psychology." The physiologist never runs across the fact of consciousness; it is not an energy category; nor does the psychologist need the concept of mind. Social psychology can regard mind as a system of pattern reactions.

P. T. Young (Illinois)

486. Gates, G. S., The Meaning of the Term "Practice." *Psychol. Rev.*, 1922, **29**, 63–75.

Definitions of the term "practice," taken from a number of standard works, are presented and discussed. The term is found to have "at least four fairly distinguishable meanings. Practice may mean (1) phenomena or processes which occur in the individual when an act is repeated; (2) it may refer to a certain kind of consciousness; (3) it may mean the act of repeating when repetition is accompanied by gain in efficiency, or (4) it may mean mere repetition whether or not accompanied by improvement."

P. T. Young (Illinois)

487. Crosland, H. R., Conscious Analysis in Learning. *Psychol. Rev.*, 1922, **29**, 75–88.

The writer criticizes a recently published paper by F. A. C. Perrin upon "Conscious Analysis *versus* Habit Hierarchies in the Learning Process." There are also some reflections upon "the most patent faults of ultra behaviorism."

P. T. Young (Illinois)

488. Washburn, M. F., Introspection as an Objective Method (Address of the president, before the American Psychological Association, Princeton Meeting, December, 1921). *Psychol. Rev.*, 1922, **29**, 89–113.

The radical behaviorist maintains (1) that consciousness does not exist, and (2) that psychology should abandon the introspective

method. Although this radical behaviorism is historically the child of functional psychology, it is logically a position which is more harmonious with structural psychology. Both structuralist and behaviorist believe that the world of physical science is a closed system, but while the latter denies consciousness the former accepts it. Sense qualities do exist. The behaviorist seems to be playing a game of hide and seek with them, attributing them now to the stimulus and again to the response. Accordingly, behavioristic metaphysics must be rejected. The world view of the writer is dualistic.

The introspective method may be of some value to the behaviorist. For him, introspection is a form of language behavior which may be studied for its own sake. But language may also be regarded as "symptomatic" of other behavior. "Symptomatic language behavior" is then synonymous with introspection in "behaviorese."

To this view it may be objected (1) that introspection is not trustworthy; that language is not a reliable index to other types of behavior. If, however, there is found to be a regular correlation between "symptomatic language behavior" and other symptoms, the trustworthiness of the method cannot be impugned. There is no evidence but introspective for the existence of after images, binocular double images, flicker effects, temperature and pressure spots on the skin, and the fusion into one of touch impressions. It may be objected (2) "that the types of behavior revealed only by introspection are unimportant and scientifically worthless." In answer to this objection it may be said that the results of psychological experiment may be important in three directions: first, they may be useful in practical life; second, a psychological investigation is important if it throws light on the functioning of sense organs or nervous system; third, to the nonbehavioristic schools, the description of mental processes is worth while for its own sake.

"If we turn to the group of phenomena for which language is the only evidence, we find, * * * that they may be subdivided into those which, like after images, binocular double images, difference tones, have an immediate relation to a known external stimulus, and those which, like mental imagery and thought processes, have a much remoter relation to outside stimuli." The behaviorist is apt to reject the second class of phenomena. Although studies by the introspective method are directed to an end which the behaviorist does not recognize as valuable, these studies have contributed largely to an end of utmost importance to the behaviorist: the understanding of

the working of the nervous system. "If the behaviorist wishes to show that the so-called higher mental processes can be supplanted on his theory by systems of movements, he will have to turn his attention to these introspective studies, or else repeat them himself, for nothing but symptomatic language reactions will furnish evidence of the proprioceptive processes required for such an explanation."

P. T. YOUNG (Illinois)

489. MELROSE, J. A., The Crux of the Psychological Problem. *Psychol. Rev.*, 1922, **29**, 113–132.

The central problem in psychology is that of conscious reflection. The older psychology, accepting consciousness as its first datum, has the theoretical advantage in the study of this problem. From the practical point of view, however, behavioristic psychology has the upper hand.

The points are illustrated by reference to a symposium, "Is Thinking Merely the Action of Language Mechanisms?" reported in the *Brit. J. of Psychol.*, October, 1920. Thinking may be more than expression. There may be an unknown factor, an X, between "situation" and "end-result." "If there be an X here, then behaviorism is inadequate at this point, and this X stands for a technic which, when assessed, will harmonize the two views by correcting the theory of behaviorism at this point and by giving to the older psychology the objectivity needed for scientific clearness."

P. T. YOUNG (Illinois)

7. SOCIAL FUNCTIONS OF THE INDIVIDUAL

490. JONES, A. M., Freddie, A Problem in Diagnostic Education. *Psychol. Clinic*, 1922, **14**, 50–53.

Freddie, a "poor little rich boy," had so many apparent disabilities that he was cast out of an ordinary kindergarten. Through the training of a diagnostic teacher, Freddie is now back in school, making normal progress, and bidding fair to make a decent citizen.

M. E. GALLAGHER (Pennsylvania)

491. WILCOX, L. D., Jimmie, the Italian Boy. *Psychol. Clinic*, 1922, **14**, 54–56.

The diagnosis given in the case of Jimmie, the Italian boy, was that he possessed normal mentality, but had not first grade competency, due to his lack of familiarity with the English language. Although Jimmie was in the second grade, he had not mastered even

the rudiments of the English language. He heard Italian at home and in the streets. He played with Italian boys. Although he was apparently a bright little fellow, he hadn't a marked language gift and consequently had not acquired English in his year and half of contact during school hours with English speaking people, because no one had taken the trouble to give him instruction in our language.

M. E. GALLAGHER (Pennsylvania)

492. STEWART, W., Joseph. *Psychol. Clinic,* 1922, **14**, 57–60.

Here is vividly described a case of congenital semialexia or word-without-letter blindness. Joseph is able to read figures fluently, and, moreover, to work with them intelligently; in addition he knows his letters, but he is unable to read words except in a very few cases. On the other hand, he is able to write, but unable to read what he has written.

M. E. GALLAGHER (Pennsylvania)

493. MCDONOUGH, D. L., George. *Psychol. Clinic,* 1922, **14**, 61–64.

If you have had your own troubles with arithmetic, or even if you were not afflicted in this way, you will be interested in the boy, George, who was "suffering from mathematics."

M. E. GALLAGHER (Pennsylvania)

494. BLOOD, M. H., The Americanization of Tony. *Psychol. Clinic,* 1922, **14**, 44–49.

Tony, a timid, distrustful Italian boy, became Americanized through the kindliness and helpfulness of a colored boy scout.

M. E. GALLAGHER (Pennsylvania)

495. PEPPER, S. C., A Suggestion Regarding Esthetics. *J. of Philos.,* 1922, **19**, 113–119.

Esthetics has had three different angles from which it may be approached, *i.e.,* the critical, philosophical, and the psychological. One who is able to make use of the critical method must do so after much experience only, and with him it is a personal matter entirely. However, for scientific esthetics it is not the one to be used. Again, the philosophical standpoint is not the one needed here, though it is useful in general to human endeavor, since it may seek a definition of beauty while the science of esthetics is "plodding in the dust of facts." As to the psychological approach to esthetics, this science is unable to give us the facts about emotions needed, and until that is developed psychology can offer us only a few simple experiments

on "sensory appreciation, balance, symmetry, etc." Esthetics must escape from psychology as economics did. It, in the first place, needs a working hypothesis, and we need a working unit, inexact at first, but which may become more definite. This common-sense concept is what is needed, and the writer believes this has been "groping its way" in the recent decades. It is a matter of "liking a thing for itself" as opposed to liking as a means to an end. This is sometimes called "intrinsic, disinterested." This unit lies at the bottom of our most modern esthetic systems.

T. R. GARTH (Texas)

496. SCRIPTURE, M. K., Some Theories Concerning Stuttering and Stammering. *Quart. J. Speech Educ.*, 1922, **8**, 145–155.

Most of the article is devoted to a discussion of stuttering (difficult speech), which the author distinguishes most clearly from stammering (incorrect speech). She offers a digest of the literature on the theories of stuttering, quoting, very briefly, the theories of Makuen, Gutzmann, Schrank, Blume, Liebmann, Schmalz, Merkl, Wineken, Goen, Freud, Hoepfner, Froeschel, Nadeleczny, Kraepelin, Scripture, Bluemel, Browning, Swift, Fletcher, and others. In addition to this digest of the literature, Mrs. Scripture gives a classification of symptoms of stuttering, and a brief discussion of therapy.

A. M. JONES (Pennsylvania)

497. HEDRICK, J., A Unique Speech Clinic. *Quart. J. Speech Educ.*, 1922, **8**, 161–165.

A description of the work at the Georgetown University Hospital Speech Clinic. The uniqueness of this clinic consists in the required attendance of the medical students. In this manner the students get an intelligent and sympathetic insight into the problems of corrective speech work. As there is an obvious need for increased knowledge regarding the problems of defective speech among physicians, this clinic is doing a very valuable bit of work. It represents a decided forward step.

A. M. JONES (Pennsylvania)

498. GOULD, R. L., Superstitions among Scottish College Girls. *Ped. Sem.*, 1921, **28**, 203–248.

Responses from 377 girls in the Normal School of University of Edinburgh gave 6038 superstitions (especially those associated with

"luck" or its opposite) which they could recall. Forty-eight per cent of the superstitions mentioned had had some effect upon the individuals' conduct, whether or not "believed" in, only 6 per cent of the girls claiming not to have been affected at all. Those from country districts were more affected than those from city. In this article a complete list of the superstitions is given, showing frequency of mention and frequency of degrees of belief, with a comparison with Dresslar's earlier study of American students.

J. F. DASHIELL (North Carolina)

499. PATRICK, G. T. W., The Play of a Nation. *Sci. Mon.*, 1921, **13**, 350–362.

To be true psychological recreation for the average American play must have these characteristics: Release from those mental and physical activities fatigued in our daily work; activity on a lower psychological plane demanding less of the total integration of cerebral processes; more primitive interests; a certain amount of rivalry and competition; the emotional catharsis effect; use of fundamental as versus finer muscular coördinations; outdoor exercise. By these tests approval is given golf, tennis, baseball, football, hunting, fishing, swimming; disapproval is given motoring, dancing, the "movies," especially the last.

J. F. DASHIELL (North Carolina)

500. DARWIN, L., The Field of Eugenic Reform. *Sci. Mon.*, 1921, **13**, 385–398.

The eugenist's aim of improving racial stock is best realized (*a*) by treating bad qualities that are dependent on one or few mendelian factors (as feeblemindedness) as individual cases, by segregation, sterilization, etc.; (*b*) but by handling the vast number of good and bad traits that are determined by many factors not as individual cases but as group traits, the aim being to raise the level of the whole people. In the case of habitual criminals the length of detention should be increased after each conviction as a matter of segregation. It is a mistake for charitable aid to be extended profusely to the economic relief of human inferiors with large families.

J. F. DASHIELL (North Carolina)

501. ADAMI, G., The True Aristocracy. *Sci. Mon.*, 1921, **13**, 420–434.

The English army developed a reliable method of examination and distribution tables for the general population in the matter of

physical capacity, and the American army did the same for intelligence. Application of these to eugenic ends would be found in a regular public examination of population and a publication of the names of those ranking in class A or classes A and B in physique, in intelligence, and in both.

J. F. Dashiell (North Carolina)

8. SPECIAL MENTAL CONDITIONS

502. Schrenck-Notsing, von, The Hopfgarten Poltergeist Case. *J. Soc. Psychical Res.*, 1922, **20**, 199–217.

Abstract of the report of the paper read in German by Dr. von Schrenck-Notzing at the First International Congress for Psychical Research.

M. C. Brooke (Pennsylvania)

503. Feilding, E., An Experiment in Faking " Spirit " Photographs. *J. Soc. Psychical Res.*, 1922, **20**, 219–223.

Douglas, of the *Sunday Express,* having had a sitting with Mr. Hope, the " spirit photographer," issued an invitation to any expert in photography to attempt the same under similar conditions by a normal process. The invitation was accepted and results reported.

M. C. Brooke (Pennsylvania)

504. Flammarion, C., A Case in Which a Fact, Apparently Known to a Dead Man Only, Was Communicated in a Vision. *J. Soc. Psychical Res.*, 1922, **20**, 244–251.

Extracts from a report which appeared in the *Revue Spirits* for April, 1921. A remarkable case with no other explanation than a recognition of personal action on the part of a dead man.

M. C. Brooke (Pennsylvania)

505. Baddeley, C. E., On " The Modus Operandi of So-called Mediumistic Trance." *J. Soc. Psychical Res.*, 1922, **20**, 238–244.

A perusal of Lady Troubridge's interesting and suggestive paper on " trance controls," exhibiting the characteristics of certain " secondary personalities." Explained on the hypothesis that it is the subconscious mind of the sitter, conveying in some telepathic manner, to the medium.

M. C. Brooke (Pennsylvania)

506. Anonymous. Reports on a Series of Sittings with Eva C. *Proc. Soc. Psychical Res.*, 1922, **32**, 209–244.

Gives a preliminary discussion, general account and detailed report of the sittings, with general conclusions, including an interesting discussion by E. J. Dingwall on The Hypothesis of Fraud.

M. C. Brooke (Pennsylvania)

507. Troubridge, Lady (Una), The Modus Operandi in So-called Mediumistic Trance. *Proc. Soc. Psychical Res.*, 1922, **32**, 344–378.

Subject is selected because the writer believes the so-called mediumistic phenomena is experiencing a very important stage in its evolution, necessitating great caution before proceeding further. Lady Troubridge suggests several ways to proceed, with interesting reasons for so doing.

M. C. Brooke (Pennsylvania)

508. Berkeley-Hill, O. A. R., A Case of Paranoid Dissociation. *Psychoanal. Rev.*, 1922, **9**, 1–27.

The writer presents a partial analysis of the delusions and hallucinations of a patient in the Ranchi Mental Hospital, India. During the first six months of his residence the patient would not submit to psychoanalysis, and the disease ran a pernicious course. After one month's analysis the patient began to show some insight into his condition, and began to realize that the chief etiological factor of his illness was the repression of *homosexual, incestuous,* and narcissistic cravings. An inferiority and impotency complex was found to be the chief determinant of a compensatory arrogance and feeling of superiority. The psychoanalysis resulted in an improvement, but probably not a complete recovery, as no mention is made of the patient's discharge from the hospital.

J. W. Bridges (Toronto)

509. Pruette, L., Some Applications of the Inferiority Complex to Pluralistic Behavior. *Psychoanal. Rev.*, 1922, **9**, 28–39.

This paper is an attempt to apply the Adlerian doctrine of compensation for inferiority to the explanation of various social phenomena. In religion the compensatory striving is obvious. It is shown in inferior man's creation of an all-powerful ally (God), in religious revivals, and in the Christian appeal to the humble and the weak. It has a place in the protestant reformation, in puritanism, and in

the effect of foreign missions. The inferiority complex and its compensating craving for power and security play a rôle in the present agitation for "blue laws" and other prohibitions, for these are usually sponsored by reformed rakes or by those "who never dared to be wicked but always wanted to." It can also be traced in the regulation of sex relationships and in the proletarian and feminist movements. The writer concludes that an important aspect of education is the wise direction of compensatory effort towards socially valuable ends; and, as this is an individual matter, it argues against the folly of education en masse.

J. W. Bridges (Toronto)

510. Stragnell, G., A Psychopathological Study of Franz Molnar's Liliom. *Psychoanal. Rev.*, 1922, **9**, 40–49.

The play Liliom first appeared in 1909 and was a failure. The audiences did not understand it, no doubt because of its symbolic nature. The writer attempts an interpretation from the psychoanalytic point of view. He finds in Liliom a personality dominated by an inferiority complex which has its organic basis in the gonadal sphere. This inferiority is compensated for by sadism and braggadocio. He attempts to gain security from his inadequacy in various forms of flight from reality: idleness, sleep, and finally suicide; but as a solution of his neurotic conflict even death is a failure. He must make atonement and return to earth to solve his problem. In Julie is found the masochistic counterpart of her husband's sadism, and she is thus able to say "It is possible that some one may beat you and beat you, and not hurt you at all." "So we can look upon Liliom as a tragedy of souls unable to fit into the world of reality. In their attempts at reliving their infantile patterns they were goaded on by infantile trends which came out one time in this way, one time in that way, but always there was an endeavor to relive symbolically the days of childhood and yet never knowing what it was all about."

J. W. Bridges (Toronto)

511. Reede, E. H., Conversion Epilepsy. *Psychoanal. Rev.*, 1922, **9**, 50–59.

It is the writer's belief that from the general mass of epilepsies may be split off a selected group, termed for convenience *conversion epilepsies,* which hold out a promise of repair by a species of psychoanalytic therapy based upon the principle of the *extension of the field of conscious control.* In these cases unconsciousness is essen-

tially a flight from a painful reality. A case of conversion epilepsy of fifteen years' standing is described. The psychoanalysis resulted in a complete recovery. Interesting psychogenetic factors for this particular case are indicated in the account.

J. W. Bridges (Toronto)

512. Moxon, C., Epileptic Traits in Paul of Tarsus. *Psychoanal. Rev.*, 1922, **9**, 60–66.

The psychoanalytic study of Paul's career and his writings reveal many morbid elements in his character and creed. He manifested a sadistic hatred of opposition alternating with a masochistic humility, the anal erotic traits of obstinacy and love of order, an exhibitionistic vanity, and a homosexuality that was probably the outcome of an overstimulated Œdipus complex which barred the way to heterosexual love. His character may be described as epileptic because he showed the main traits of this disease, namely: religious fanaticism, egotism, irritability, emotional storms, sadistic hatred, tendency to the repetition of trite phrases and exaggeration of the trivial, and some disturbances of consciousness. Paul has provided a type of christianity that appeals to the repressed, undeveloped, guilt-laden, and fanatical christians of every age. The psychoanalytic study helps to a better evaluation of his teachings and in the ascription to them of their proper importance.

J. W. Bridges (Toronto)

513. Diamond, I. B., A Case of Neurosis with Obsessions. *Psychoanal. Rev.*, 1922, **9**, 67–73.

This is an account of an intelligent and imaginative girl who developed attacks of dizziness, palpitations, anxiety, and obsessing fears as a result of the repression of certain unpleasant sexual experiences. Her neurotic symptoms completely disappeared with the psychoanalytic revelation of the pathogenic experiences, and two years have elapsed without their return.

J. W. Bridges (Toronto)

9. NERVOUS AND MENTAL DISORDERS

514. Yerkes, R. M., A New Method of Studying the Ideational Behavior of Mentally Defective and Deranged as Compared with Normal Individuals. *J. of Compar. Psychol.*, 1921, **1**, 369–394.

As regards the range of applicability, to lower animals and to human beings of varying capacities, ages, and conditions of mental

health, the multiple choice method of investigation ranks probably as the most valuable contribution to present-day psychology. With the human subject alone, the method has untold possibilities, for performance tasks projected in its use can be arranged from the most simple up through the most difficult, by unbroken gradations of difficulty. And its method of scoring or evaluating capacities far excels most methods extant. Yerkes gives the history of the method, from its inception at the hands of G. V. Hamilton to its present form for human subjects in the hands of Yerkes himself. A full description of the apparatus, along with cuts, and of the method is given, with results obtained by the technique from superior, normal, defective, and deranged adults. The essential principle of multiple choice procedure is the arranging of tasks or problems to be executed or solved by the reagent upon his discovery of the system or principle in which the separate successive steps or acts are arranged, such, for instance, as the finding of food through the *lighted* alley (regardless of where the *lighted* pathway may be or when the light is given), or the finding of an exit by trying alternately right and left doors of a compartment, or the finding of an exit by selecting at each trial the left door next to the door which led to the last success, or the attainment of success by the discovery that two doors to the right must be skipped or avoided in each subsequent trial, and so on for any kind of task or for any kind of problem. The apparatus, designed to be used with human subjects, consists of a set of twelve reaction keys, arranged by a system of plugs and wirings so that erroneous keys will cause lights to appear and that the correct key will cause an electric buzzer to operate. The experimenter is separated from his reagent by a screen, and he arranges the contacts, as suits his prepared order or system of presentation, so that in the different trials the buzzer key is a different key but its relation to the preceding buzzer key is a constant one. This relation can in subsequent series of trials be made increasingly difficult. The number of trials, before unfailing success is attained, and the progress of attainment of success through increasingly difficult orders of key arrangement, are recorded and are used as measures of ability to discover ideationally the principle of key arrangement employed by the experimenter. A tentative programme of trial problems or trial seriations is offered for standardization and modification by future investigators.

The author gives statistical results from forty-eight normal subjects, grouped as superior males and females, and as medium males

and females, and from thirteen defectives. He gives typical results also from four deranged reagents suffering respectively from dementia precox (hebephrenia), manic-depressive depression, general paralysis (with insight), and Korsakoff's psychosis.

Suggestions are given for further use of the apparatus and the method, and incorporated in the article is a full bibliography on the multiple choice procedure to date.

H. R. Crosland (Oregon)

515. Fildes, L. G., A Psychological Inquiry into the Nature of the Condition Known as Congenital Word-Blindness. *Brain*, 1921, **44**, 286–307.

The aim of the investigation described in this article was to discover something about the psychological characteristics of a condition commonly called by the "misleading term" of word-blindness. It represents an inquiry into the following three theories regarding the cause of this condition: (1) The theory that assumes the existence of definitely localized and circumscribed visual and auditory word-centers in the brain, the destruction or isolation of which will destroy language in either its visual or auditory aspect; (2) a theory which interprets word-blindness as only one symptom in a general lowering of mental ability; and (3) one which attributes the condition to a more specialized lowering of power in the primary visual centers. A psychological investigation was made of the problems raised by these different interpretations, namely, whether the inability to read or loss of the power to read is due to a general or specific defect and, if the latter, whether the deficiency shows itself only in reading or whether it appears to be a general lowering of the visual power. Twenty-six subjects, all between the ages of nine and sixteen, were used in this investigation. Four of these were in attendance at ordinary elementary schools and twenty-two at special schools for mental defectives. Tests for reading ability led to the estimate that no child was retarded less than four years in reading ability although great variability in the reading ability of the subjects existed. Preliminary work showed that no relationship existed between the IQ's and the ability of the subjects to read. As a result of this and other facts, a series of experiments devised to test the following three activities, presumably involved in the failure to retain what had actually been taught to the group of nonreaders, were developed. (1) Tests of rapid and easy visual discrimination of

form, together with the ability to retain these without undue repetition. (2) A similar rapid and easy discrimination of sound. (3) The possibility of establishing readily an association between a given form and a given sound. The tests were arranged into three groups and each was given to most of the members of the nonreading group and the results compared with those of a group of readers (number not given) equated as far as possible with the nonreading group with regard to age and mental ability. The following conclusions are drawn from these results: (1) Nonreaders as a group make association between meaningful material as readily as do the readers, but difficulty is increased at a rate in excess of that of the readers with increase in similarity between form and sound presented. (2) The ease with which an association is established depends upon the nature of both name and form. (3) In making for ease of association between form and sound, (*a*) they should be readily distinguished from each other, (*b*) they should have meaning. The bearing of this experimental work on the theories held as explanatory of the inability to learn to read or failure to read seems to be as follows: (1) The defect underlying inability to read is specific and not general in nature. "General defect" is more frequently accompanied by a loss of power in this as in all other abilities than is normal mentality. (2) There is nothing in the results to indicate the existence of a visual-word center in the brain. (3) The experiments support the theory that word-blindness is but an aspect of a more general, yet still in itself specific, defect either in the visual or auditory region or in both. There seems to be a primary disability of the auditory or visual regions resulting in the failure of the forms or sounds presented to gain any meaning.

M. S. Viteles (Pennsylvania)

516. Smith, L. G., Speech Defect Resulting from Ether Shock. *Ped. Sem.*, 1921, **28**, 308–312.

A patient who had had a "dream" under anesthetic of suffering her tongue rendered immovable found on recovery from the drug serious impediments in speech that had not wholly disappeared sixteen months later. Before the above experiences the patient had spent hours trying to help a stammerer.

J. F. Dashiell (North Carolina)

10. INDIVIDUAL, RACIAL AND SOCIAL PSYCHOLOGY

517. Vorberg, G., Der Klatsch über das Geschlechtsleben Friedrichs II. Der Fall Jean Jacques Rousseau. *Auftrage d. Internat. Gesells. f. Sexualforsch.*, 1921, **3**, 6–28.

In dem ersten Aufsatz versucht Vorberg an Hand historischen Materials die weit verbreitete Ansicht von der Homosexualität Friedrichs des Grossen zu zerstören. Die zweite Abhandlung gibt einen Einblick in das Seelenleben Jean Jacques Rousseaus. Wir lernen einen vom Wahn- und Zwangsvorstellungen verfolgten, in seinen Leistungen und Ideen genialen Menschen kennen, der trotz seiner psychopathischen Veranlagung und der Verfolgungen seiner Gegner unentwegt sein Ziel verfolgt. Zum Schlusse widerlegt Verfasser die weit verbreitete Fabel von dem Tode Rousseaus, nach der er ermordet worden sei oder Selbstmord verübt haben soll. Die zweite Studie ist deswegen interessant, weil sie zeigt, dass psychopathische und geniale Veranlagung in einer Persönlichkeit vereinigt sein kann.

Skubich (Magdeburg)

518. Moll, A., Behandlung der Homosexualität: biochemisch oder psychisch? *Abhand. aus d. Gebiete der Sexualforsch.*, 1921, **3**, 71 pp.

Während man besonders unter dem Einflusse Steinachs zu der Auffassung neigt, man könne eine erfolgreiche Behandlung der Homosexualität nur auf operativem Wege erreichen, tritt Moll dieser Ansicht in vorliegender Abhandlung entgegen. Einerseits scheint ihm die Grundlage der Theorie von der biochemischen Veränderung sehr problematisch zu sein und andererseits weisen sehr vielseitige Erfahrungen an Heilungen Homosexueller darauf hin, dass eine psychische Beeinflussung und Heilung der Homosexualität oft eintreten kann. Eine Hauptgefahr für die Entwicklung und das Bestehenbleiben der Homosexualität sieht Verfasser in der Suggestion, dass die Homosexualität eine angeborene, unveränderliche Disposition darstelle, die sich der psychischen Beeinflussung entziehe.

Skubich (Magdeburg)

11. MENTAL DEVELOPMENT IN MAN

519. Thompson, J. R., The Interference Factor in Mental Processes. *J. of Exper. Ped.*, 1921, **6**, 12–20.

The assumption of interference factors gives considerable facility in explaining results in correlation and in transfer. A comprehen-

sion test and two tests of silent reading were given to classes in a boys' school. Initial tests were followed by a period of organized practice, and final tests at the end of five weeks. Where interfering factors operate to mask a common element the transfer effect is reduced. Low correlations can be accounted for without assuming numerous specific elements, and the real transfer may be greater than that measured by experiment.

H. E. JONES (Columbia)

520. MILLER, K. G., The Competency of Fifty College Students. *Psychol. Clinic,* 1922, **14**, 1–25.

The aim of Dr. Miller's study was to examine certain data which have been collected relative to each member of the class in elementary psychology at the University of Pennsylvania during the academic year 1919–20. This information consists of the score obtained in a "general intelligence examination," the results of a series of psychological tests, a rating on estimated competency, and a rating based on the academic standing of the individual as determined by the final grades received in all courses completed at the University.

M. E. GALLAGHER (Pennsylvania)

521. JONES, E. E., An Ancient Score Card. *Psychol. Clinic,* 1922, **14**, 26–35.

Dr. Jones, some twenty years ago, when principal of a large high school, used a simple score card to check what appeared to be native capacities and abilities in students. He gave students a rating of from 6– to 100 on Mental Capacity, Intellectual Honesty, Energy, Ambition, Industry, Independence and Originality, and Promise of Success. In developing the score card, Dr. Jones continually had in mind prognostic evaluation. After a lapse of twenty years, Dr. Jones found it comparatively easy to determine the validity of the score cards as filled out for diagnostic purposes upon high school students at that time.

The score cards indicate approximately the individual differences that we would expect to find among students. There are approximately five groups; a very exceptional group showing a high range of possibility for future success; a group just below which shows capability and efficiency but not quite so good as the superior group; a great middle group of those possessing average ability; a poor group just below the middle group having possibilities in certain

directions but limited as to general capacity and leadership; and a fifth group consisting of those who show the lowest possibilities of success.

M. E. GALLAGHER (Pennsylvania)

522. VITELES, M. S., Sergeant X, A Study in Vocational Guidance. *Psychol. Clinic,* 1922, **14**, 36–43.

An impaired memory proved a serious handicap to Sergeant X, in his former occupation as laboratory man. After a trial of five months, he found he could not successfully carry on his former work. The problem presented by this case was one of Vocational and Educational guidance. Dr. Viteles demonstrates that the use of the material and method of the clinical psychologist, whose instrument for scientific determination is the psychological test, and the method of such determination is the qualitative analysis of competency into its component specific abilities, is a method superior to the "haphazard" method.

M. E. GALLAGHER (Pennsylvania)

523. WELLS, W. R., A Historical Anticipation of John Fiske's Theory Regarding the Value of Infancy. *J. of Philos.,* 1922, **19**, 208–210.

John Fiske is credited with making an important contribution to the theory of evolution when he called attention to the meaning and value of infancy which makes possible the prolonging of that period of life in human beings in contrast with the contrary condition in other animal groups. Not so long ago a book was discovered in a bookstore by Mr. George W. Robinson, secretary of Harvard Graduate School, called "Friends Annual, or Aurora Borealis," being a book of essays written for the Society of Friends and published in England in 1834. In this book is an essay entitled "On the Helpless State of Infancy," which is merely signed by the initials V. F. The writer undertakes to show the "graciousness of Providence in providing a long period of helpless human infancy." Both Fiske and this writer had the same objective, evidently, for the former sought to "justify the ways of God to man" by pointing out the goodness of the Power which was working in the evolutionary forces. It is likely that the limited circulation of the little book never reached Fiske, but it is interesting to note how difficult it is for anyone to be strictly original in his thinking.

T. R. GARTH (Texas)

524. WATSON, J. B., and WATSON, R. R., Studies in Infant Psychology. *Sci. Mon.*, 1921, **13**, 493–515.

One can make or break the child so far as its personality is concerned long before the age of five, the pattern of the future individual being laid down as early as two. Psychological laboratories ought to be able to make cross-sections of the infant's activity at different ages and tell whether the activities are running the normal course. This work would also furnish the necessary basis for adult personality analysis and vocational guidance.

The authors' experimental studies have made a beginning. Ninety-eight per cent of all infants at birth could support their own weight by *grasping,* and this persisted to age of 124 days, and much longer in a few, particularly those suspected of slow development. *Reaching* appearing as a learned reaction, both as a positive bringing of candy to mouth and as a negative reaction to flame, is established at 150 days. It is not aroused by objects more than twenty inches distant. No evidence for right- or left-*handedness* was found in 100 infants, either by amount and nature of hand movements or by anatomical measurements. *Eye movements* were at first tropism-like, later fixating and following linear movements, still later following complete circular movements. The *Babinski* reflex normally appeared in infancy, disappearing irregularly up to one-plus years. *Sitting alone* was shown by most infants by six months. Studies are being made on other activities: defensive responses by foot and by hands, blinking, crawling, extensor thrust, etc.

Effective stimuli to *fear* were found to be sudden removal of support and loud sound, but not darkness, animals, nor fur. The stimulus to *rage* was any hampering of the infant's movements. *Love* was aroused by a variety of stimulations. Conditioned fear reaction was produced in one infant for a white rat, not formerly feared; this was retained for several days, and was transferred to animate and furry but not other stimuli. The establishment of an adequate institution generously financed for systematic studies of this general sort on infancy is urged.

J. F. DASHIELL (North Carolina)

525. MERRILL, M. A., Relation of Intelligence to Ability in the "Three R's" in the Case of Retarded Children. *Ped. Sem.*, 1921, **28**, 249–274.

Two hundred and ten children in special classes of Oakland, Cal., schools were compared as to their standings in Stanford-Binet and

in certain school achievement tests (Haggerty, Kansas, and Thorndike Alpha for reading; Woody B and Cleveland for arithmetic; Ayres for spelling; Ayres for writing). Results showed: definite positive group correlations between absolute mental level (not I Q) and school ability; wide variability of school ability at same mental level; educational tests now in use ill adapted to subnormal children because of inadequacy at lower end of scale.

J. F. Dashiell (North Carolina)

526. Hall, G. S., The Dangerous Age. *Ped. Sem.*, 1921, **28**, 275–294.

Adolescence and senescence are conceived as the two main divisions of life, middle age showing only the phenomena of the gradual turning from one to the other. Rich biographical studies of the mental aspects of the turning point and also of senescence in all their individual variations foreshadow a forthcoming work by the author on Senescence.

J. F. Dashiell (North Carolina)

12. MENTAL EVOLUTION

527. Lashley, K. S., Studies of Cerebral Function in Learning. II. The Effects of Long Continued Practice upon Cerebral Localization. *J. of Compar. Psychol.*, 1921, **1**, 453–468.

Lashley presents his third report of the results obtained from cauterizing selected areas in the cerebrum and cortex of the rat after long-continued habit formation. His main objective, in this series of tests, was to discover whether or not automatization consists of the relegation of function from the cortex to subcortical nuclei (from the visual cortex to the pulvinar and the external geniculate body). Many current physiological theories have maintained such a relegation to be a fact; and Münsterberg's *Actionstheorie,* although designed to meet objections to the relegation doctrines, ascribed very great importance to the subcortical nuclei. Lashley's research, here reported, was done on four rats, and compared with work done earlier on two other rats (the total number of rats worked on is brought to sixteen in this article). His method consisted in teaching a rat a visual discrimination habit, in a maze of two alleys irregularly darkened and lighted, through 1300 or more trials, in the hope that

overlearning would result in automatization. Then he produced lesions, in orbital, or temporal, or parietal, or occipital, or occipital-cortical localities, by cautery. After observations, twenty-four hours later, concerning the presence of shock, the rat was run through retention test trials, to discover the presence of the habit after the lesions had been effected. Then followed more practice until the animal had thoroughly relearned the habit. The investigator's conclusions are as follows: (1) Destruction of the visual area results in the loss of the well-formed visual discrimination habit; (2) the retention of other habits proves that the loss of the visual discrimination habit is not a result of operative shock; and (3) long training did not prevent loss of the habit,—hence, the function was not transferred, or relegated, from the visual area, to the subcortical nuclei which had been left intact.

H. R. Crosland (Oregon)

528. Stark, P., Studien über traumatotrope und haptotrope Reizleitungsvorgänge mit besonderer Berücksichtigung der Reizübertragung auf fremde Arten und Gattungen. *Jahrb. f. wiss. Botanik.*, 1921, **60**, 67–134.

Die in dieser wichtigen und interessanten Arbeit beschriebenen Versuche ergeben, dass man bei Gräsern die Keimlingsspitze (Koleoptile) abschneiden und auf dieselbe Pflanze oder eine andere dekapitierte Pflanze derselben Art, ja sogar von anderer Art oder Gattung wieder aufsetzen und trotzdem beobachten Kann, dass der traumatotrope oder haptotrope Reiz von der Spitze nach dem unteren Teile über die Schnittfläche weggeleitet wird, mit gestaffeltem Erfolg je nach der systematischen Verwandtschaft. Es ist anzunehmen, dass der Reiz durch Diffusion von spezifischen Stoffen übertragen wird, die nach der Verwandtschaft gestaffelt sind. Denn auch wenn man Extrakte von verwundeten Koleoptilen einseitig an den Wundrand von Koleoptilstümpfen anfügt, führen diese ebenfalls positiv gerichtete tropistische Krümmungen aus. Dasselbe geschieht, wenn man einseitig an die Schnittfläche Koleoptilzylinderchen ansetzt, die sich in traumatotrop gereiztem Zustand befinden, sogar wenn die zylinderchen vorher durch Kochen getötet sind. Verf. weist zum Schluss auf analoge von Ricca an Mimosa 1916 ausgeführte Versuche hin.

Möbius (Frankfurt a/M.)

529. Lieske, R., Pfropfversuche. IV. Untersuchungen über die Reizleitung der Mimosen. *Ber. d. deutsch. bot. Ges.*, 1921, **39**, 348–350.

Die Versuche ergaben, dass der von einer Mimose perzipierte Reiz durch Pfropfung auf eine andere Art übertragbar ist, auch wenn die Reizerscheinungen in beiden Arten wesentlich verschieden sind.

Möbius (Frankfurt a/M.)

530. Lundegardh, H., Die Beziehungen zwischen Lichtwachstumsreaktion und dem Phototropismus. *Ber. d. deutsch. bot. Ges.*, 1921, **39**, 195–200.

Die quantitative Untersuchung des Krümmungsvorgangs und die Wachstumsmessung während der Krümmung zwingen zu dem Schluss, dass die von Blaauw, Sierp und dem Verf. beschriebene Lichtwachstumsreaktion nicht Ursache der phototropischen Krümmung ist.

Möbius (Frankfurt a/M.)

531. Lundegardh, H. Zur Theorie der phototropischen Perzeption. *Ber. d. deutsch. bot. Ges.*, 1921, **39**, 223–229.

Die an Haferkeimlingen angestellten Versuche mit tangentialer und halbseitiger Beleuchtung von oben her zeigen, dass die Perzeption nicht auf blossen Helligkeitsdifferenzen beruhen kann, sondern dass die Richtung der Lichtstrahlen maassgebend ist.

Möbius (Frankfurt a/M.)

532. Guttenberg, H. v. Untersuchungen über den Phototropismus der Pflanzen. III. Giebt es ein Sinusgesetz des Phototropismus? *Ber. d. deutsch. Ges.*, 1921, **39**, 101–108.

Es handelt sich um die Frage, in welchem Ausmaass die phototropische Reizung parallalotroper Pflanzenteile von der Grösse des Lichteinfallswinkels abhängt. Die Untersuchungen an Haferkeimlingen ergeben, dass für sie das Sinusgesetz des Phototropismus zutrifft.

Möbius (Frankfurt a/M.)

533. Bolte, E., Ueber die Wirkung von Licht und Kohlensäure auf die Beweglichkeit grüner und farbloser Schwärmzellen. *Jahrb. f. wissens. Botanik.*, 1920, **59**, 287–324.

Die unter Pfeffers Leitung in Leipzig ausgeführte Arbeit kommt zu folgenden Resultaten. Es giebt (1) Schwärmzellen, die am Licht

zur Ruhe kommen und im Dunkeln entweder bis zu ihrem Absterben beweglich bleiben (Haematococcus-Typus) oder wenigstens länger als am Licht (Chlamydomonas tingens-Typus). Hieher gehören besonders die Schwärmer festsitzender Grünalgen, sie stossen am Licht die Geisseln ab und kommen da zur Ruhe, wo sie unter günstigen Beleuchtungsverhältnissen auskeimen können. Es giebt (2) Schwärmzellen, die durch Lichtentziehung früher oder später zur Ruhe Kommen, und das sind ausser den Purpurbakterien besonders grüne Flagellaten, die kein festsitzendes Stadium haben. Es giebt (3) viele photokinetisch indifferente Schwärmzellen, auf deren Beweglichleit das Licht also keinen Einfluss hat. Dass die Dunkelstarre in engerem Zusammenhange mit dem Aufhören der Assimilation stände, liess sich, wenigstens als allgemeingiltig, nicht nachweisen. Zwischen Photokinesis (d. h. der Reaktion auf Licht durch den Grad der Beweglichkeit) und Phototaxis scheinen enge Beziehungen zu bestehen. Bei vielen grünen und farblosen Schwärmernist die Kohlensäure zur Bewegung notwendig. Gewisse grüne Volvocineen und Flagellaten verfallen nach einem Aufenthalt von 1–5 Tagen in einem Kohlensäurefreien Medium in einen Starrezustand, aus dem sie durch Kohlensäurezufuhr wieder befreit werden können. In einzelnen Fällen konnte die Kohlensäure durch andere Säuren ersetzt werden, während dies in gewissen Fällen (so bei Volvox und Pandorina) nicht möglich war.

MÖBIUS (Frankfurt a/M.)

534. SIERP, H., Untersuchungen über die durch Licht und Dunkelheit hervorgerufene Wachstumsreaktion bei der Koleoptile von Avena sativa und ihren Zusammenhang mit den phototropischen Krümmungen. *Zeits. f. Bot.*, 1921, **13**, 113–172.

Die hier mitgeteilten Versuche sollen einen weiteren Beitrag zur Frage liefern, wie das Licht die Wachstumsintensität beeinflusst, und damit auch wie die Lichtstrahlen von den Pflanzen perzipiert werden. Nach der Theorie von Blaauw giebt es eigentlich keine phototropischee Ktümmungen, sondern sie entstehen sekundär dadurch, dass die stärker belichtete Seite weniger wächst als die schwächer belichtete. Verf. will auch diese Theorie auf ihre Richtigkeit prüfen und tritt am Schluss für sie ein. Ausschliessliches Versuchsobjekt sind die Keimlinge des Hafers, bei denen die Spitze des Keimblatts (Koleoptile) als lichtempfindendes Organ fungiert, von dem der Reiz zu den unteren sich krümmenden Teilen geleitet wird. Es ergiebt sich, dass das Licht eine doppelte Wirkung hat: einmal

verwandélt es den geradlinigen Wachtumsverlauf in einen wellenförmigen und sodann hat es noch eine sekundäre Wirkung, die durch eine zweite Kurve ausgedrückt wird. Die Verdunkelung giebt eine der Lichtwirkung entsprechende Wellenlinie, die aber genau umgekehrt wie die Lichtwellenlinie verläuft. Die verschiedenen Lichtmengen liefern innerhalb weiter Grenzen ganz verschiedene Krümmungen. Doch handelt es sich um recht verwickelte Vorgänge. Die sog. autotrope Rückkrümmung führt Verf. auf die nach der Verdunkelung auftretenden Dunkelwellen, von denen oben die Rede war, zürück.

MÖBIUS (Frankfurt a/M.)

535. FUNK, G., Ueber das Verhälten der Oscillatoria amphibia Ag. im Kolonie-Verband. *Ber. d. deutsch. bot. Ges.*, 1920, **38**, 267–278.

Vorläufige Mitteilung über Untersuchungen an Qscillarien im Kolonieverband, dessen Bewegungsformen sich teilweise auf phototaktische und mechanische Reaktionen zurückführen lassen. Neu beschrieben werden Reaktionen auf thermische und elektrische Reize.

MÖBIUS (Frankfurt a/M.)

536. METZNER, P., Die Bewegung und Reizbeantwortung der bipolar begeisselten Spirillen. *Jahrb. f. wiss. Botanik*, 1920, **59**, 325–412.

Im Anschluss an die Untersuchungen Buders über die Purpurbakterien beschäftigt sich der Verf. mit den Spirillen, die an beiden Polen ihres Körpers ein geisselbüschel tragen. Dieses verhält sich aber wie eine einfache Geissel. Die Energie für die Bewegung wird von der gesamten Zelle mit Hilfe der Stoffwechselprozesse geliefert, und der Energieverbrauch wird für beide Geisseln gemeinsam geregelt. Die Rotationsrichtung ist von dieser "Zentrale" nur insofern abhängig, als beim spontanen Wiederbeginn der Bewegung nach vorübergehender Ruhe beide Geisseln gleichsinnig arbeiten. Dagegen kann jede Geissel selbständig Reaktionen auf Reize ausführen. Der Augriffsort der Reaktion liegt in der Nähe der Geisselbasis, und der Reaktionsort ist vermutlich derselbe Plasmabezirk, die Reaktionszeit ist im Allgemeinen Kürzer als 1/10 Sekunde. Die Wiederherstellung des reaktionsfähigen Zustandes beansprucht etwa 1/5 Sekunde. Dauernde Reizung führt zu rhythmisch wiederholter Auslösung der Reaktion. Der von einem Geisselsystem aufgenommene Reiz wird durch das Körperplasma

auf die anders Geissel übertragen und zwar so rasch, dass praktisch beide Geisseln gleichzeitig umgeschaltet werden, wenn nicht die Erregbarkeit herabgesetzt ist. In diesem Falls und bei schwacher Reizung kann as so weit kommen, dass nur die direkt betroffene Geissel allein reagiert. Ein schwacher direkter und ein unterschwelliger Reiz können sich wahrscheinlich summieren und bei herabgesetzter Erregbarkeit und diffuser Reizung eine gleichzeitige Reaktion beider Geisseln bewirken. Bei Neutralsalzen, guten Nährstoffen und den gewöhnlich in ihrer Begleitung auftretenden Stoffen findet eine Ansammlung der Spirillen in mittlerer Konzentration statt, Steigerung und Erniedrigung der Konzentration löst die Bewekungsreaktion aus. Mässig giftige aber intensiv reizende stoffe (z. B. Bleinitrat) werden gemieden, aber stark giftigen und mässin reizenden Stoffen gegenüber sind die Spirillen schutzlos (das Gift übt wahrscheinlich eine lähmende Wirkung aus). Bei Kokain uni Chloroform wirkt nicht nur das Konzentrationsgefälle, sondern der Reizstoff selbst als Reiz, die dauernde Reizung drückt sich in rhythmisch wiederholten Schreckbewegungen aus.-Photodynamisch aktive Farbstoffe lähmen im Licht und bei Gegenwart von Sauerstoff, die Geisselthätigkeit (indem sie vermutlich dies dazu nötigen Stoffe im Körper zersetzen, denn eine spezifische Giftwirkung ist nicht nachzuweisen). Schwache photodynamische Wirkung kann als Reiz empfunden werden und zu phototaktischen Bewegungen führen, und zwar verhalten sich Spirillen in Farblösungen schon bei schwacher Beleuchtung negativ phototaktisch: Verf. bezeichnet die Erscheinung als induzierte Phototaxis. Mässige Temperatursteigerung reizt die Geisselbewegung an, starke aber lähmt sie. Temperaturerniedrigung bewirkt Umschaltung der Geisseln, und andauernde Abkühlung ruft rhythmisch wiedernolte Reaktion hervor. Bei mechanischem Druck findet ein Aufspalten der Geisseln statt, wofür die Ursaehen im Einzelnen noch nicht nachzuweisen sind.

MÖBIUS (Frankfurt a/M.)

537. STERN, K., Ueber polare elektronastische Erscheinungen. *Ber. d. deutsch. bot. Ges.*, 1921, **39**, 3–10; 11–20.

An Berberis vulgaris (Staubfäden), biophytum sensitivum (Blätter) und Mimosa pudica und Spegazzini (Blätter) wurde untersucht, wie die nastischen Bewegungen ihrer Organe durch den elektrischen Strom beeinflusst werden und zwar mit besonderer Berücksichtigung der Richtung des Stromes. Im Allgemeinen werden die Resultate von Ritter (1809) und Bose (1906) bestätig.

Die Gelenke der Mimosen zeigen polare elektronastische Erscheinungen, die Art der Polarität (Anoden- *oder* Kathodenreizung oder Anoden- *und* Kathodenreizung) ist abhängig von äusseren und inneren Bedingungen, wie Höhe der angelegten Spannung, Alter, Erregbarkeitszustand und Spezies. Aus dem Umstand, dass polare Erscheinungen nicht nur bei Elektrotaxis und Elektrotropismus sondern auch bei Elektronastie auftreten, und aus den analogen Erscheinungen an tierischen Nerven und Muskeln geht hervor, dass es sich hier um eine für die Wirkung des elektrischen Stromes auf die lebende Substanz charakteristische Erscheinung handelt.

MÖBIUS (Frankfurt a/M.)

538. OEHLKERS, F., Zur reizphysiologischen Analyse der postfloralen Krümmungen des Blütenstiels von Tropaeolum majus. *Ber. d. deutsch. bot. Ges.*, 1921, **39**, 20–25.

Die mit Hilfe des Klinostaten angestellten Versuche ergeben, dass Ueberkrümmungen und Schleifenbildungen als nastische Reaktionen nur dann anzusehen sind, wenn die tropistischen Reaktionen ausgeschaltet sind, und dass bei Vorwiegen des Tropismus eine Ueberkrümmung erst durch das eigentümliche basipetale Wachstum des Stieles zustande kommt. Mit der Befruchtung steht die Umstimmung in keinem Zusammenhang.

MÖBIUS (Frankfurt a/M.)

539. GRADDMAN, H., Die Bewegungen der Windepflanzen. *Zeits. f. Botanik.*, 1921, **13**, 337–393.

Verf. der besonders mit Bowiea volubilis gearbeitet hat, Kommt zu dem Resultat, dass die Bewegung der Windepflanzen in der Hauptsache durch den Geotropismus zustande kommt.

MÖBIUS (Frankfurt a/M.)

540. WALTER, H., Wachstumsschwankungen und hydrotropische Krümmungen bei Phycomyces nitens. Versuch einer Analyse der Reizerscheinungen. *Zeits. f. Botanik.*, 1921, **13**, 673–716.

Nach der Ansicht des Verf. ist die von Blaauw aufgestellte Lichtwachstumsreaktion nicht für den Lichtreiz spezifisch, sondern auch bei plötzlicher Feuchtigkeitsänderung bekommt man bei Ph. n. ahnliche Wachstumsschwankungen. Wie diese im Einzelnen verlaufen, kann hier nicht referiert werden. Es sei nur erwähnt, dass Verf. theoretisch erörtert, wie wir uns eine fördernde oder

hemmende Reizwirkung auf das Wachstum vorzustellen haben, und weshalb die Pflanze bei einem plötzlichen Reiz nicht direkt vom früheren Gleichgewicht in das neue übergeht, sondern Schwankungen ausführt. Diese scheinen ihm durch die zwischen Wachstum, Atmung und Stoffzufuhr bestehenden Beziehungen erklärbar zu sein.

MÖBIUS (Frankfurt a/M.)

541. COLLANDER, R., Der Reizanlass bei den thermotropischen Reaktionen der Wurzeln. *Ber. d. deutsch. bot. Ges.*, 1921, **39**, 120–122.

Es fragt sich, ob die in Sägespähnen wachsenden Wurzeln wirklich thermotropisch reagieren oder ob diese scheinbare Reaktion durch Hydrotropismus zu erklären ist. Verf. kommt (ohne neue Versuche) zu dem Resultat, dass die erstere Ansicht zu Recht besteht.

MÖBIUS (Frankfurt a/M.)

542. KESTNER, O., Klimatologische Studien. I. Der wirksame Anteil des Höhenklimas. *Zeit. f. Biol.*, 1921, **73**, 1–6.

Hunde, die durch Pyrodin oder Aderlass anämisch gemacht worden sind, regenerieren ihr Blut in Höhenlage besser als in der Ebene. Um den wirksamen Faktor festzustellen unternahm K. folgende 3 Versuchsreihen. (1) Es wurde ein anämischer Hund im Stall bezw im Freien gehalten. (2) Der Hund kam in einen Kasten unter einen Druck, der 2300 bis 2600 m. Meereshöhe entspricht, täglich 6–7 Stunden. (3) das Tier wurde vor eine Bogenlampe von 40 Amp. ohne Glasschirm 2–3 Stunden täglich gesetzt. Die entscheidende Wirkung wurde bei Bestrahlung erzelilt. Dabei braucht die Bestrahlung nicht direkt zu erfolgen, wenn man die Luft aus dem Raum, in dem sich die Bogenlampe befindet, der Tieren zuleitet so genügt es auch. Es werden also wahrscheinlich durch die Sonnenstrahlung Stoffe erzeugt, die die Blutregeneration befördern.

P. HÖFFMANN (Würzburg)

543. HESS, C. v., Mikroskopische Beobachtung der phototropen Pigmentwanderung im lebenden Libellenocell. *Zeits. f. Biol.*, 1921, **73**, 277–284.

Frisch gefangene Libellen (*Calopteryx virgo*) werden mit schmalen Papierstreifen an die senkrechte Kante eines Korkwürfels befestigt, der Kork wird unter das Mikroskop gebracht (50 fach

Vergrösserung) Dunkel gehaltene Tiere zeigen zunächst eine dem Tapetum entsprechende weisse Fläche, dann tauchen in den mittleren unteren Teilen feinste dunkelbraune Fäden auf, die in grosser Zahl angenähert parallel zu einander mit spitzen Fortsätzen vorrücken, schon nach 1 Minute erscheint der ganze Hintergrund braun

P. Hoffmann (Würzburg)

BOOKS RECEIVED

PRESCOTT, F. C., *The Poetic Mind,* New York, 1922: Macmillan. Pp. x+308. $2.00.

STRATTON, G. M., *Developing Mental Power,* Boston, 1922: Houghton Mifflin. Pp. vii+77. $.80.

MÜNSTERBERG, MARGARET, *Hugo Münsterberg,* New York, 1922: Appleton. Pp. vii+449. $3.00.

GIDDINGS, F. H., *Studies in the Theory of Society,* New York, 1922: Macmillan. Pp. v+308.

RIVERS, W. H. R., *Instinct and the Unconscious,* Cambridge, 1922: Univ. Press. Pp. v+277.

HERRING, J. P., *Herring Revision of the Binet-Simon Tests,* Yonkers, 1922: World Book Co. Pp. 56. $1.00.

THURSTONE, L. S., *Vocational Guidance Tests,* Yonkers, 1922: World Book Co.

BAKER, H. J., and KAUFMAN, H. J., *Detroit Kindergarten Test,* Yonkers, 1921: World Book Co.

DOWNEY, J. E., *Downey Individual Will-Temperament Test,* Yonkers, 1921: World Book Co.

WINKLER, H., *Die Monotonie der Arbeit,* Leipzig, 1922: Barth. Pp. 45. M. 12.

HAINES, T. H., *Report of the Maryland Mental Hygiene Survey.* Pp. ii+96.

CABOT, H., *Some Problems in Medical Education as they concern the University of Michigan.* University Bulletin. Ann Arbor, 1921. Pp. 10.

FAY, D. W., *A Psychoanalytic Study of Psychoses and Endocrinoses,* Washington, D. C., 1922: Nervous and Mental Diseases Publishing Co. Pp. iii+122.

HOBSON, R. P., *Alcohol and the Human Race,* New York. Revell Co. Pp. 15.

BAINBRIDGE, W. S., *La Chirugie et le Cancer Avancé,* Brussels, 1921: Ministre de la Defense Nationale.

NOTES AND NEWS

Dr. Walter R. Miles, research psychologist at the nutrition laboratory of the Carnegie Institution of Washington, Boston, has been appointed professor of experimental psychology at Stanford University, to fill the vacancy created by the retirement of Professor Frank Angell at the close of the present academic year. Dr. Angell has been professor of psychology at Stanford almost from the time of the opening of the university, having joined the faculty in 1892.

Dr. Harry D. Kitsch, professor of psychology at Indiana University, will lecture at the summer session of the New York University School of Commerce and Finance, giving courses on employment psychology and the psychology of advertising and selling.

Dr. Wallace Craig of the University of Maine has resigned as professor of philosophy and psychology. He will spend a half year in Great Britain and Germany. Dr. H. M. Halverson, of Clark University, has been appointed professor of psychology in the University of Maine.

Dr. Floyd H. Allport, instructor in psychology at Harvard, has been called to an associate professorship at the University of North Carolina.

Professor June E. Downey, head of the department of psychology of the University of Wyoming, has been granted leave of absence for the year 1922-1923 and will spend the time in study and travel. During her absence the work of the department will be in charge of Lovisa C. Wagoner, as chairman of the department, and Donald A. Laird of the University of Iowa.

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THE

PSYCHOLOGICAL BULLETIN

CONTRIBUTIONS TO THE HISTORY OF PSYCHOLOGY—1916–1921

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Contributions to the history of psychology since 1915 fall naturally into two groups. There are, on the one hand, the systematic and the experimental studies which have made the science six years older. There are, on the other hand, the historical and biographical notes and the large and searching retrospections which relate contemporary psychology to earlier stages in the development of the science. It is to an enumeration of these contributions that the present paper is devoted. We cannot, of course, comment in detail upon the character of contemporary psychology, for an historian, speaking of his own times is like the Hawaiian surf-rider who seeks to judge the incoming tide from his experiences while riding a single wave; but it is possible to get a certain amount of information about the current trend of a science by considering events of various kinds which reflect or which have, presumably, influenced its general course. These events taken in conjunction with what appear, at the present moment, to be outstanding experimental and systematic studies may give a suggestion of the history of the last few years.

In psychology, as well as in many other sciences, the most important event, during the period under survey, was the World War. The science of psychology was, as all know, well on the way toward complete mobilization for military purposes when the war ended. Since many of the consequences of this reorganization have not yet appeared, a detailed account of this aspect of the period must fall to a future historian. A few facts are, however, available. For example, more than a fourth of the members of the American Psychological Association entered military service in special

branches,[1] and several laboratories undertook the solution of psychological problems of military import. Although there seems to have been no such organized mobilization in France, England or Germany, nevertheless many foreign psychologists contributed important material bearing upon military occupations. Much of the interest of foreign nations fell to the diagnosis and treatment of "war psychoses"[2] although special problems in aviation demanded considerable attention (36).[3] In America, the science systematically set out to render aid (a) in the air service; (b) in the intelligence service (104); (c) in personnel work and in the selection of men (8, 83, 88); and (d) in the solution of special technological problems involving visual and auditory perception (112, pp. 105–124), morale (39), military instruction (112, pp. 124–128), mental methods of diagnosis and cure, the mental causes of war, and the like (40, 41, 110). The active participation of the science in the war had been presaged by a rapid growth in the various branches of psychotechnology and early in 1917 the first definite step was taken in the organization, by the National Research Council, of a Committee on Psychology (111). A little later the American Psychological Association appointed twelve committees whose work, as planned, encompassed nearly all that the science could do in the emergency (111, 112). By the end of the year the work of these committees was well under way, either in laboratories, at training camps, or in the field (112).

Aside from many lesser, but nevertheless significant contributions to the war, the most important work was done, apparently, in connection with the air service, the medical service and in the selection of men. In the medical research laboratory established at Mineola, Stratton, Dunlap, Watson, Bentley and others initiated important studies upon the psychophysical qualifications of the prospective aviator. Studies were made, for example, upon perception, equilibration (63), and the integrity of mental states under low oxygen pressure (1, 23, 119). As we have suggested, the greatest contri-

[1] See *J. of Appl. Psychol.*, 1917, 1, 394–395 for some of the early appointments. A list of appointments as of November, 1918, appears in the same journal, 1918, 2, 294–295, 386.

[2] For titles running into the hundreds see the *Psychological Index*, 1916, 22; 1917, 23; 1918, 24; etc. Relevant titles are found under VII–7, IX–1-a and b, IX–9, X–3.

[3] For a large number of other titles see *Psychological Index*, especially Division VII–7 during the years 1915–1921.

butions of the psychologist to medicine appear to have been made in England, France and Germany where highly successful methods of diagnosis, treatment and cure of "war psychoses" were devised. The most elaborate work in America and that which has made the greatest public appeal consisted of the administration to two million men of mental tests which were directed toward the fulfillment of a comprehensive plan of intelligence rating. The selection of men and their assignment to the several branches of the service rested upon the results of these tests (113, 87, 118, 114, 115).

Events of smaller scope which reflect the course of the science or which may be expected to have an influence upon it are (a) the appearance of new journals and the discontinuance of others; (b) the establishment of new laboratories, psychological institutes and departments; (c) the annual addresses of the presidents of the American Psychological Association; and (d) the necrology of our six-year period.

(a) Under the adverse conditions the number of new psychological journals which have appeared is significant as regards the vitality of the science. In 1916, the *Journal of Experimental Psychology* was founded by Watson. Late in 1917 its publication was suspended because of the war; but in 1920 it was revived and now continues with experimental articles, the *Psychological Review* printing theoretical articles and discussions. The *Journal of Delinquency,* devoted to "the advancement and encouragement of scientific investigation in the problems related to social conduct" was also begun in 1916. *Psychobiology,* a journal devoted to problems common to psychology and to the biological sciences, was founded by Knight Dunlap in 1917. The *Journal of Applied Psychology,* the official organ of a growing number of men interested in the general field of psychotechnology and a new Swiss journal, the *Schweizer Archiv für Neurologie und Psychiatrie,* edited by C. v. Monakow, began in the same year. *Mental Hygiene* appeared at the beginning of 1918 with the attempt to bring "reliable information" to all those interested in "methods of prevention or treatment in the broad fields of mental hygiene and psychopathology." *Personnel,* begun as a publication of the Committee on Classification of Personnel in the Army, in 1918, was made a permanent publication by the National Association of Employment Managers in 1919. 1918 also saw the publication in Peru of the *Revista de Psiquiatria y Disciplinas Conexas. Psyche und Eros* began publication in 1919. In 1920 *Psychobiology* joined its interests with the *Journal of Animal*

Behavior which had ceased publication in 1917. A new title, *The Journal of Comparative Psychology,* was adopted and the editors, Dunlap and Yerkes, were prepared to accept any "studies contributing to the knowledge of mental function and behavior in any organism." During the same year there was established the *Archivio Italiano di Psicologia* with Kiesow and Gemelli as responsible editors, the *International Journal of Psycho-Analysis,* and the *Archivio generale di Neurologia e Psichiatria.* In 1921 the *Journal of Abnormal Psychology* widened its interests under the new title, the *Journal of Abnormal Psychology and Social Psychology,* while the *American Journal of Insanity* changed its name to the *American Journal of Psychiatry.* The *Revue Metapsychique* and *Psychologische Forschung,* the latter under Koffka, began in 1921. Aside from temporary suspensions due to the war, the most serious loss in journals occurred when Wundt's *Psychologische Studien* came to its final volume bearing the date 1918.

(b) Under the impetus furnished by new laboratories, multiplying textbooks, new institutes and a rapidly growing number of trained men, the academic status of the science had continued to improve. The details of this improvement are shown in the 1919 report of the Committee on the Academic Status of Psychology (2) and in the statistical inquiry by McGeoch (62). The latter reports the establishment in this country of twenty-two new laboratories during the last decade. This number is nearly equalled by the establishment of new laboratories in Germany, France, Italy and Japan. In France there has been established (1920) a new Institute of Psychology at the University of Paris under the direction of Professors Delacroix, Dumas, Janet, Piéron, and Rabaud. A similar institute for experimental psychology was opened in 1917 at Constantinople by Professor Anschütz of Kiel. The organization of the American Association of Clinical Psychologists in 1917 and the establishment in Boston and Chicago and in other large cities of municipal psychological laboratories reveals the equally rapid growth of "applied psychology."

(c) The addresses of the presidents of the American Psychological Association are significant (i) because they reveal the thought of the individual who has been given one of the highest honors among American psychologists, and (ii) because they often strike at the heart of problems confronting, at the moment, the entire science. Watson's address in 1915 on the place of the conditioned reflex in psychology certainly revealed a problem of the hour for it empha-

sized in no uncertain way the author's rejection of orthodox methods and results (101). In 1916 Dodge spoke on the "Laws of Relative Fatigue," a title which suggests the course of some of his own studies, but which, at the same time, emphasized a problem that has become perennial in psychology and in certain allied sciences (21). In 1917 Yerkes reviewed the "history of the organizing of psychological military service" under the title "Psychology in Relation to the War" (111). As we have suggested, the war had inevitably to increase interest in psychotechnology, or "applied psychology" as it is more commonly known, and Scott's address in 1919 on "Changes in some of our conceptions and practices of personnel" shows the swing of the pendulum in this direction (78). There was no presidential address in 1918, a small meeting of the Association being devoted to military problems. In 1920 the age-old problem of mind-body relations was reviewed by Franz in a setting furnished by the modern psychopathic hospital rather than by philosophical speculation (28). Miss Washburn's address in 1921 was a sign of returning "normalcy" for it undertook to answer one of the challenges set by Watson's pre-war address on method (98). Under the title "Introspection as an Objective Method," she sought to show that introspection or "symptomatic language behavior" is as trustworthy as the methods accepted in other descriptive sciences.

(d) The necrology for our six-year period is large enough to remind us again that the science is rapidly passing into a third generation. Külpe, Meumann, Witasek, Fabre and Weismann in 1915; Münsterberg, Mach, Alzheimer, Müller-Lyer, Royce, Oppenheim, Norsworthy, Kidd, Horsley and Ribot in 1916; Brentano, Carus, Abramowski, Grasset, Tyler, and Dubois in 1917; Hering and Maudsley in 1918; Baird, Mercier, Ladame, Raleigh and Tamburini in 1919; Wundt, Flournoy, Hyslop, Southard, Leclère, Meinong, Delage and Siebeck in 1920; and Ladd, Lehmann, Verworn, Ewald, Boutroux and Erdmann in 1921, are the most important men in psychology and in related disciplines that have left their laboratories to their students.

In spite of the heroic times through which the science has been passing, there are, at the present moment, no indubitable signs of a material or permanent change in its general character. It is doubtful, however, if such signs would be recognized should they appear, for American psychology, as a single illustration, is the product of so many and such diverse interests that one cannot recognize, at times, even its central problems. A science which has drawn its materials

from the highly sophisticated German philosophy of the last century, from the physics and physiology of the whole continent, from the biology and animal behavior of England and America, and from the studies of the French upon mental pathology may turn without warning in any direction, especially when the responsibility for a considerable part in the future development of the science has fallen upon a people who are not naturally given to a love of profound criticism and endless detail but who do have a tremendous capacity for practical affairs. A classified tabulation of the titles appearing in the *Psychological Index* during the last ten years and an inspection of the titles themselves seem, however, to suggest the following inferences: There has been a steady decrease of interest in mind-body relations of the philosophical kind, in general discussions of sensation, in visual sensations (except for 1921), in attention, in comparison and judgment, and in testimony. There has been a growing interest in auditory, cutaneous, olfactory, gustatory and organic sensations including the alleged "static" sensations. Under audition, for example, stands the attack made upon the Helmholtz theory by Wrightson and Keith (108, 11), Rich's study of tonal attributes (70, 71), and Watt's Psychology of Sound (100). The outstanding work of 1916, to take another example, was done by Henning on taste and smell (42, 43) in which the old Linnean and Zwaardemaker classification was replaced by six fundamental qualities forming the corners of a triangular prism upon which all other smell qualities might be placed. The system of taste qualities he arranged into a tetrahedron.

Perception, the functions of the muscles and glands, the various branches of psychotechnology, and social psychology also present distinct advances in interest. Aside from a few other departments which depend almost wholly upon laboratory facilities and which, accordingly, suffered during the war, most of the divisions of the science as listed by the *Index* have continued at the same level for a number of years. Historical notes, relations with other sciences, general problems, methods, apparatus, studies on the nervous system, psychophysics, affection and emotion, instinct, memory, thought, unusual mental states and functions, and animal psychology continue to command a modicum of interest. The number of papers in a given subject is not, of course, a reliable index of the quality of the papers, nor of their systematic importance, and it is quite possible, therefore, that a future survey will see in them a turn of the science in one direction or another.

If it is necessary to hazard a guess as to which way the science is turning one might be tempted to say that the leaven of behaviorism is at work and that the future will see less of the German tradition and more of mind and body as operating or performing in the business of living. It may be for this reason that psychotechnology, including under this term all the applications of psychological facts and principles to law, medicine, education, industry and the like, has developed at a greater rate than any other division of the science. As we have intimated, the war period was a "jubilee year" of "applied psychology." The movement initiated by Stern's "individual psychology" and Münsterberg's industrial enthusiasms has now passed wholly beyond its earlier position of minor interest in the discipline. Those who have looked with alarm upon the rapid way in which the various psychotechnologies have drained the science and laboratories of men and who have seen this drainage tremendously augmented by the war are inclined to believe that the science has fallen, in its youth, upon unfortunate times. On the contrary, those who felt that psychology was losing its contact with a mind whose chief characteristics were alleged to be found during actual mind-body operation and accomplishment, or those who felt that the discipline should administer primarily to the mentally sick, to the deficient, to the aberrant or to such processes as education, believe that the war and the demand for an applied science have saved the discipline from academic abstraction. As we have suggested, there is very little in the character of contemporary research to show which way, if in either, the main current of the science is apt to run. It may turn out that the biological tradition has thrown us a little off our feet by sending us after a mind whose very existence depends upon adaptation and use. A functional psychology, or, according to Titchener's analysis, a psychology of act, leads naturally to an emphasis upon practical values. On the other hand, it may turn out that we have buried ourselves too deeply in the German tradition with the result that *mental analysis* has taken us too far away from *mind-body operation.*

We shall turn, now, to the second large part of our task, *viz.*, that of enumerating and commenting upon the historical and biographical notes and the large systematic histories. We shall review, first, the general histories, and secondly, the more limited or special historical notes. Only one major contribution has been made to the general history of psychology during the period under survey. The period was prefaced by Baldwin's *History of Psychology,* the first

general history to appear in English, and Klemm's *Geschichte der Psychologie,* which was translated into English by Wilm and Pintner. In 1921, however, the second and third volumes of Brett's *History of Psychology* appeared, thus completing a task which he had set for himself in 1912 when his *History of Psychology, Ancient and Patristic,* was published. As will be recalled, 348 pages in the first volume were consumed in tracing the development of psychological thought from Thales to Augustine. The second volume continues to record, on the plan established in the first, in chronological order, "the steps by which psychology has reached its present stage of development." It includes also an estimate of the condition and contribution of all those phases of human thought to which psychology is allied. The second volume contains four parts given respectively to (a) the background of medieval thought; (b) to medieval doctrines; (c) to the sixteenth and seventeenth centuries; and (d) to the eighteenth century. The third volume falls into two parts, the first dealing with the "age of transition" and the second describing modern psychology. Fechner, Lotze, Stumpf, Wundt, Mach, Avenarius, Horwicz, Brentano, Lipps, Hartmann, Bain, Spencer, the Mills and James are referred to generously in the third volume.

Brett's history, taken in conjunction with those that have been published prior to the period now under survey, represents a high type of historiography. We still have, however, no history of psychology (37). An historical survey which spends four-fifths of its space in getting as far as 1860 is but a prolegomenon to the history of the *science.* Of the prolegomena, Brett has written one of the best. The science needs, however, a general history which will do for the whole science what Warren has done for the Association Psychology (97). This study was presaged in 1916 by a chapter on "Mental Association from Plato to Hume" (96), a study which began with Aristotle's establishment of the problem under his principles of similarity, contrast and contiguity and his doctrine of the fusion of experiences. The study, which constitutes Chapter II in the book, goes on to review the contributions of the post-Aristotelians, of Descartes, Hobbes, Locke, Berkeley, and Hume. Chapters III, IV, and V in the book are devoted to Hartley, Brown, Spencer, and Lewes. Chapter VI summarizes the preceding five chapters. Chapter VII sketches the development of Associationism on the Continent. The remainder of the volume (three long chapters) gives a comprehensive summary of the experimental studies upon association and a

statement of some of the relations of association to systematic psychology.

A number of other excellent special historical reviews have appeared although none of them is so searching or so complete as Warren's. The first of these, during our period, was Bentley's study of the psychological antecedents of phrenology (6). The writer found that "the historical importance of Gall touches not so closely the vagaries of his doctrine of phrenology as the fact that he sought empirically to integrate the psychological and anatomical knowledge of his time." (6, p. 115). The foundations of Gall's system are found, in part, in French Sensationalism and, in part, in the doctrine of faculties and in the German empirical psychology of the close of the eighteenth century. Another special study of importance has been done by Stratton on early Greek physiological psychology as it appears in a fragment by Theophrastus (82). Stratton finds in Theophrastus the "most important source of our knowledge of the earlier Greek physiological psychology" ". . . for an acquaintance with what these earlier investigators knew and thought of the observable processes of the mind—the processes by which we gain our impressions of the outer world and reproduce and elaborate these impressions; the processes of pleasure and pain; and the connection which all these and emotion and purpose have with the different parts or states of the body—of all these matters that are so important for modern psychology Theophrastus gives in this fragment a report far fuller than we find in Aristotle's *De Anima,* even when this is supplemented by the historical material in the other works of Aristotle. And one may in perfect justice go even farther and say that for a knowledge of Greek psychology before Plato—apart from the question as to the nature of the soul, which Theophrastus almost wholly ignores—we are indebted to Theophrastus for more than to all the other ancient authorities combined" (pp. 15–16). Stratton's study is divided into three sections, the first dealing with Theophrastus as a psychologist of sense perception, and as a reporter and critic of other psychologists, the second with the text and translation of the text, and the third with notes upon the translation and upon the original text.

Boas has uncovered an interesting item in the history of affective psychology (10). In a dissertation by J. J. Reich, a pupil of the famous G. E. Stahl, of Halle, the argument is made in typical scholastic fasion that "emotional phenomena" cause such disturb-

ance in the body as dumbness, apoplexy, paralysis, fever, epilepsy, and the like. Gardiner has also contributed to the history of the affections by making a systematic survey of early views on the subject (31, 32, 30). In his first article he reviews the Platonic conceptions of affection and emotion. He finds in Plato "the first considerable attempt at an affective psychology" although it must be confessed that "he drew largely on his predecessors" for his material. These predecessors are Heraclitus, Empedocles, Anaxagoras, Diogenes, Hippocrates, and so on. "Plato's doctrine of pleasure and pain was developed in relation to the ethical controversies of his time and conditioned by current conceptions as well as by his own ethical and metaphysical inquiry. . . . The more complex affections, the emotions and passions, are regarded in part as modifications of pleasure and pain, and in part as distinct." The second article considers Aristotle. He, like Plato, treated affection, it is alleged, from other than purely psychological interests. Under Gardiner's interpretation of Aristotle "pleasure is the accompaniment of the free, unimpeded expression of the natural capacities, pain the accompaniment of conditions detrimental to such expression" (p. 6). Pleasures differ in quality, they exercise a facilitating effect upon the activity which they accompany, and they differ in purity. Gardiner then goes on to unravel Aristotle's tangled description of the passions and the emotions. In the third article he follows the development of the subject through the post-Aristotelian philosophy. Here, as in the case of Plato and Aristotle, he finds that the studies were always under the influence of practical interests and the results conditioned in no small degree by ethical and metaphysical considerations which lie largely outside of psychology. He finds evidence, however, of a growing sense of the complexity of the problem and believes that modern achievements in this field are by no means in proportion to the time that has elapsed since the Greeks struggled with them.

In another branch of the science Denton (18) has pointed out that the mature views of Herbert Spencer differed materially from his earlier psychological writings. "Crude notions of fatigue and of attention" as well as a thorough-going doctrine of phrenology are discovered by Denton in Spencer's earliest writings.

General reviews of recent history have been appearing in the PSYCHOLOGICAL BULLETIN up to 1920 (72). Yearly summaries of progress in the science have appeared regularly in Appleton's *Yearbook* and in the Yearbook of the *New International Encyclopedia.* A few other general reviews have also been written. In a survey of

ten years of American psychology Ruckmick (76) found that, contrary to the assertions of many that the science had fallen upon a "strange and troubled time" and that during the fifty-odd years of its existence as an experimental discipline it had signally failed "to make its place in the world as an undisputed natural science," there was every indication of an energetic growth and of the final attainment of first rank among other sciences. Dwelshauvers has reviewed more at length contemporary French psychology (24), but like too many historians of psychology much of his time is spent on the philosophers from Maine de Biran to Bergson instead of upon the psychologists.

In recognition of a quarter century birthday, the *Philosophical Review* published, in 1917, among other papers, two on the development of psychology during the preceding twenty-five years. Miss Washburn, in her retrospections over the quarter century (99), found that a statement made at the beginning of the period was just as true in 1917 as it was in 1892. The statement is "Psychology which, by enlarging its field of observation and improving its methods of investigation, has within the last decade probably outstripped every other province of human knowledge in the rate of its growth."[1] Miss Washburn has shown in broad outline how the science has continued to enlarge its field of observation and to improve and multiply its methods. Pillsbury's paper cites some of the new developments in the science during the quarter-century (68). In 1892 "Wundt's system had reached approximately its final form; James had published his chief books, and Ribot had written his more important works. . . . With some important exceptions experiment had been confined to sensation, to Weber's law, to space perception, and to reaction times. Ebbinghaus alone had worked on memory; only preliminary experiments had been made upon association and the ideational processes; the physiological accompaniments of mental processes had been little studied, and most of the results obtained were found later to be incorrect" (68, p. 56). As examples of new developments in the science since 1892 Pillsbury sets down the great amount of experimental work upon which modern discussions are based, the development of the applications and of the branches of psychology such as education, psychiatry and mental pathology, the development of tests of intelligence, animal psychology, the rise of behaviorism, the psychology of advertising, and the like.

[1] See prefatory note, *Phil. Rev.*, 1892, 1, 7.

The writer has found little change during the quarter century in "the persistence of opposing or contradictory theories and in the capacity of different men for drawing opposite conclusions from the same premises and the same observed facts" (p. 67). "As one compares the psychology of the present with the psychology at the time the *Review* was founded, one sees that the advance, great as it is, has not been in the line of development of a single system or even in a tendency to accept a common viewpoint. Rather has it been in the accumulation of facts in an ever widening domain and in the development of complete or partial explanations of separate problems . . . there have been no revolutionary discoveries, and most of the great changes in the point of view that were proclaimed or proclaimed themselves to be epoch-making have with time proved to be less striking and of less importance than they seemed at first sight" (p. 69).

Saffiotti's review of the development of experimental psychology in Italy is a distinct contribution to historiography (77). Into twenty-four pages he has crowded the rapid development of Italian psychology from the publication by Guisippi Sergi in 1873 of the *Principi di Psicologia sulla base delle scienze sperimentali,* to the other important systematic texts, to the organization in 1896 of the first experimental laboratory by Tamburini and the founding of the various psychological journals together with a characterization of the psychology which Italy has produced.

Aside from these studies of direct historical value, there is a group of miscellaneous writings which reflect more or less upon the history of psychology or which are introductory to the history. Galen's studies on the "natural faculties" (13), Leibnitz's life and work (14), Hume's relation to Malebranche (22), Rousseau's doctrine of the right to believe (105), Francis Bacon and the modern spirit (61), the James-Lange theory in Lessing (58), psychophysical parallelism as a psychological episode in history (56), the scientific productivity of American professional psychologists (29), the number of articles of psychological interest published in the different languages (25), notes on the presidents of the American Psychological Association (65), Jewish pillars of psychology (73), the Jewish founders of collective psychology (74), the blood and soul in ancient belief (107), the development of British thought (95), Malebranche's conception of psychology (92), the function of intuition in Descartes' philosophy of science (66), Ribot's psychology and its relation to contemporary thought (54), the history and development of thought and emotion

in the middle ages (86), and the relation between the color theories of Schopenhauer and of Goethe (4), are some of the topics which fall in this group.

Obituary notices and biographical notes often contribute generously to the history of a period. The life and work of Wundt have been referred to or reviewed by Kraepelin (51), Titchener (90, 91), Wirth (106), by his American Students (84), and by an anonymous writer (120). Ladd's work has been eulogized by Hicks (47), and Seashore (79). Brentano has been given his place temporarily in the science by Kraus (52), and Titchener (89). The latter sets Brentano over against Wundt both of whom are regarded in the light of the "conditions under which their respective psychologies acquired their form and substance." A notice of Külpe's life and writings has been written by Fischer (27). The fortunes of that great genius Helmholtz are traced by Karpinski (50) from his formulation at twenty-six of the law of the conservation of energy through the *Handbuch der physiologischen Optik* and through his other great achievements. Some of Helmholtz's possible predecessors in the field of audition are suggested by Gradenigo (35), Mendenhall reviews his work in physiological optics (64). Hess has written an appreciative review of the work of E. Hering, especially in the field of vision (46). Verworn likewise has written of him (93).

Sheard has given a timely review of Thomas Young's relation to the early development of physiological optics (80). Various aspects of the life and work of C. Pierce have been treated by Royce and Kernan (75), Ladd-Franklin (53), Jastrow (49), and Dewey (20). Royce has also been honored in the same way by Bennett (5), Cabot (15), Howison (48), and Olgiati (67). Among other men in psychology and in related fields who are listed biographically or historically are Ribot (94), Münsterberg (81), Tamburini (26, 38, 116), Southard (117), Raleigh (57), Haeckel (19), Ewald (33), Mach (44), Erdmann (85), da Vinci (7, 17, 55), Fabre (103), Crooks (3), Lombroso (12, 59), and Virchow (9, 60, 102). William Stern's fiftieth birthday has been signalized by a survey of his scientific work (16).

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THE EVOLUTION OF PSYCHOLOGICAL TEXTBOOKS SINCE 1912

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A study of the psychological textbooks published during the last ten years reveals changes innumerable, reflecting modifications in the conceptions of the subject-matter and the principles of psychology. Such changes are mirrored in the general organization of material as well as in the specific contents of the texts. Especially noteworthy is the emphasis on the genetic development of simpler adaptations into more and more complex ones, and further the inclusion of chapters on behavior, on language, learning, intelligence and other topics which found little or no place in psychology books of the previous decade. Much of this is, of course, to be expected because of the inevitable addition to knowledge which the earnest search by students must bring forth. But on the other hand, the question forces itself upon the reviewer of psychological textbooks whether the observed changes and additions merely represent such normal accretions. Or do they also symptomatize developmental trends in a particular direction? Is there not, such a surveyor must ask himself, some apparent goal toward which the science of psychology is tending?

Evidence convinces us that there is present today a characteristic inclination of our recent textbooks; that is, they represent a new manner of looking upon the facts of psychology. So much we might says with confidence, even if we cannot discern striking complete advances in viewpoint and method. Coincident with the fact that the books of the present decade show no diminution in their stress of biological factors is another fact, namely, that more and more are psychologists stressing biological factors in organic rather than in structural or physiological terms. That is to say, psychologists are attempting to express facts more and more in terms of the complete organism rather than in specific parts (brain, etc.) or isolated functions (neural). The emphasis of the organic, however, does not exhaust the changes we find in the psychological domain.

More positively still we may state the goal toward which psychology is progressing, namely, it is becoming more objective; its subject-matter is coming to be looked upon as being more naturalistic, more definitely open to inspection and to standardized evaluations. Merely consider the attempts that are made to reduce the entire series of psychological facts to the operation of reflexes in various combinations, especially as exemplified by Bechterew's work (2). That psychological development is turned definitely in the direction of objectivity no one probably will care to deny, but what, we might ask, is the significance of the objectivism toward which psychology is tending? Do we mean merely that psychologists are attempting to take their discipline out of the domain of speculative discussion and bring it into the realm of scientific investigation? No, for that achievement has in a general sense been accomplished. Certainly in the last half century with the development of various laboratory techniques a very respectable amount of objective psychological data has been isolated, even though it be argued that its significance and importance has not been adequately appraised. When we say that psychology is becoming objective we mean that there is an approach to a psychological science in which the data studied are derived from an unbiased matrix of actual natural science happenings. In addition these data are investigated without alien presuppositions directly borrowed from other phases of human thought, whether physiological or metaphysical. And furthermore, the facts studied from such an objective standpoint are themselves unambiguous psychological data and are interpreted from a definitely psychological standpoint. Tendencies toward such an objective goal we will attempt to point out in the following discussion.

In anticipation we might say that even in those textbooks in which we find a single or several objective characteristics the book cannot on the whole be considered as representative of an objective psychology. Again, even when we are fairly certain that a textbook unmistakably contains many of these characteristics we are not to be understood as asserting that the author thereof is aware of an objective tendency or intends his book to participate in such a development. Furthermore, let it not be understood that we are describing an evolution or development that is universal in scope. No, it is possible that many textbooks offer not the slightest suspicion of such a trend as we are tracing out. In fact our purpose in this article is simply to point out particular evidences of a tendency which we feel certain is a definite and growing condition in the

present psychological world. Nor do we assert anything further than that this tendency exists; we argue nothing as to its prevalence or future development. Keeping in mind the task we set ourselves will sufficiently explain our choice of textbooks, their number and geographical distribution. (Note that Külpe [*Vorlesungen über Psychologie,* 1920, p. 10] asserts that the advance of psychology toward being an independent natural science in America must also come about in Germany.) More clearly to show this objective trend we will consider a series of specific crucial problems which will indicate to us the general development which our hypothesis assumes to be current.

I. Subject-Matter

With respect to the subject-matter or the data of the science of psychology the textbooks coming within our purview show unmistakable tendencies of a striving toward objectivity, that is, making psychological data into autonomous facts to be observed and described. To a considerable degree we might consider this viewpoint as a new emphasis rather than a totally new departure, because ever since the advent of psychology as a laboratory science psychologists have been very precise in their insistence upon the objective (scientific) character of their data; in other words, this emphasis represents a refinement of a prevalent objective attitude. This refinement we might say in brief consists of a more definite attempt to avoid epistemological implications. Accordingly, psychology scales the ladder of definition which starts from the "positive science of the behavior of living things" (6), passes through the notion of studying responses to stimuli (13, 14, 15) and ends in the region of physical objects in interaction (11). Certainly a very typical symptom of this objectifying attitude is the statement in Meyer's book (7) that psychology studies the "other one."

As we might expect, the objective form of defining the data and stating the purpose of psychology is not always consistently carried through the whole work of the psychologist who thus delimits his field of investigation. Thus Pillsbury (10), while sympathetic with the view that psychology is the science of behavior, departs little from the orthodox, eclectical, functional-structural viewpoint. Also Münsterberg's work (8) illustrates the fact that an objective definition and mechanical interpretation may merely signify a tribute to the entrance of biological conceptions in psychology. Now although we might cheerfully admit that for the most part the definition of psychology as the science of behavior is merely a developmental

incident celebrating the advent of biological conceptions in psychology, and that to a considerable extent to define psychology as the science of behavior is merely to suggest the functional character of psychological facts, we cannot but believe that this definition inevitably points or leads to a more objective attitude toward the facts studied. To consider just one point, is it not true that the behavioristic definitions of psychology now current have been greatly reinforced by the observations of infrahuman reactions? And surely such observations to be successful must be made in a purely objective spirit.

Whatever the situation may be with respect to definition we believe that the actual descriptions indicate that the subject-matter is considered at least by a number of psychologists to be purely objective. Evidence for this may be found in the frequent reference to a psychological machine (7, 11) and the ideal of prediction in psychology (14). To repeat, what we want to emphasize here is the point, that while not all psychologists share in this objective trend, there exists a definite tendency on the part of textbook writers to make psychology a more objective science than was the case with writers of the previous decades who merely stressed the biological basis for psychological facts. To state it differently, there are signs of a definite attempt to make psychology into a complete definite natural science instead of merely asserting that the facts of psychology are related to or based upon biological factors.

In studying the changes in the textbooks of the past decade a significant observation is that the problem of what psychology does in fact study is a very live topic with psychologists. Does not such an inquiry, invoking as it does defense and offense, indicate a new direction, somewhat different from that which was previously current?

II. The Nervous System

Perceptible changes of a marked degree in the treatment of the nervous system argue further for an increasing objectification of psychological facts. In the first place, there is a definite movement away from the attitude that the nervous system is a mere physical correlate of mental states which are presumed to be substances or processes of a different order. Quite easily can we trace out a fairly definite series of stages or levels of viewpoint with respect to the nervous system. When it is not considered as merely a physical counterpart of mental states it has been used to indicate the possibility of retaining ideas and of the serial or processional action of those ideas.

Very definitely divergent from this use of the nervous system is the attitude that the nervous apparatus and especially the central nervous system, is not of any primary importance in the operation or occurrence of a psychological fact. Watson (14) in particular has suggested that we must not make a fetish of central neural activity. Let the reader understand; we do not in any instance mean to insinuate that there is a gradual progress of viewpoint. In some cases as in Warren (13) for example, we find a suggestion of a comparatively early viewpoint concerning the relation of the nervous and the mental elements. In making the qualities and intensity of consciousness depend upon the differential operation of the nervous apparatus, Warren suggests the doctrine of Spencer and Lewes. To be exact, Warren makes the nervous system serve partially as a physical aspect of the mental and in part as the determining mechanism for mental states. On the whole, however, there can be no manner of doubt that Warren is attempting to make psychology into a definite branch of natural science, for the nervous system as a factual phenomenon is treated as a prominent feature of the psychological fact. The significance of Warren's book lies above all in his striking out for a more objective and behavioristic standpoint in psychology.

Our interpretation of the different attitudes found in the textbooks of the decade under discussion points then to a modified viewpoint, though perhaps an attitude as yet not clearly articulated. There can be no doubt, however, that the nervous system is coming to be more and more considered as an integral part of a psychological response. Such a treatment of psychological behavior amply indicates the way toward the complete objectification of psychological data.

Possibly the best indication of the tendency we are suggesting lies in the books in which (a) the neural apparatus is definitely made into a part of a response, or (b) in which the neural act is made to include the muscular and less frequently the glandular functions also. The latter method is definitely developed by Meyer (7), while the former is to a very considerable extent featured by Woodworth (15), but has probably been most adequately developed by Watson (14). Here as elsewhere in this review we are striving to keep within the bounds of the author's intention and so it is only fair to point out that while Woodworth (15), for example, very skillfully presents the facts of association and learning in an objective stimulus and response manner without the explanatory use of neurones, he still

adds at the end of that discussion a bit of neural interpretation. Thus, while to all outer indications he very expertly integrates the neural phases of reaction systems with the other factors comprising them, it may still be that he thinks of the nervous function in a less objective way than the integration appears to indicate. But in our search for illustrations of our hypothesis of the developing objectivity of psychology we may still consider Woodworth's textbook as a symptom of a markedly changing attitude.

III. Organization of Material

Especially significant as a further sign of the objectification of psychology, it seems to us, is the changing general organization of textbook material. Of course we still have very prominent the analytical organization starting from simple mental processes (sensations) and going up to the most complex ones. But on the other hand, this form of organization is at times very widely differed from. In some cases a book may contain a summary of experimental work in various fields such as mental testing, animal work, abnormal, etc., and then the mental processes presumed to make up these responses are dealt with perhaps in a traditional way. In such an organization the general viewpoint of the author may show very few signs of an objective tendency. In fact Hunter (5), who makes use of such an organization, discusses consciousness in the traditional manner and makes use of the nervous system as a causative condition in the operation of mental states. In spite of this situation, however, we may still consider this textbook as illustrative of the development in an objective direction. At any rate it indicates that the old analytic method is not so solidly established as not to allow any departure from it.

More definite objective approaches we find in the textbooks under discussion such as the fact that psychologists organize their books so as to feature the concrete development and operation of behavior acts. Sometimes the organism is early in the book stated to be a psychological machine, an organic apparatus, which operates in various ways. Examples of such organization are exhibited by Meyer (7) and Smith and Guthrie (11).

In Woodworth (15) there is a striking confirmation of the tendency to make the psychological processes a series of definite responses of a growing and expanding individual. Thus in his early chapters Woodworth discusses the reflexes and other simpler acts and indicates

how they develop into more complex behavior such as learning, memory, thinking, etc.

On the whole the tendency toward newer and different forms of organizing material seems to be to get closer to a nonsubjectivistic description of the adaptational functions of the psychological organism. The implication follows that the psychologist is describing some actual natural processes, some objective happenings. Incidentally it seems to us the statements tie up better with what one can observe than would otherwise be the case. In fact, the newer attitudes make psychological facts into concrete events. In a certain sense this means that psychological materials are appreciated more and more on their own account and thus the psychologist does not find it necessary to reduce his data, whether stimuli objects or response action, to introspective abstractions in order to give them the semblance of science.

IV. Consciousness

The tendency toward objectification is no less shown when we trace out some of the changes with respect to the conception of consciousness in the recent textbooks. To start first with a book written by one of the foremost American representatives of the structural or mentalistic viewpoint we find that Titchener's volume (12) indicates considerable modification in this direction. In the first place, the use of the term consciousness is entirely eliminated from the volume as a definite tool. And it is our opinion that this change in the *Beginner's Psychology* is correlated with a greater utilization of the nervous system as a determining principle in psychology than is true in Titchener's *Textbook*. In abjuring the use of the term consciousness Titchener explains that it is rejected because it stands for knowledge or awareness, whereas the psychologist any more than the physicist has nothing to do with such things. Titchener's entire discussion at this point appears to us as a striking attempt to put the facts of psychology upon a more objective and natural science basis than has hitherto been the case in his books. In the present volume Professor Titchener insists that sensation must be thought of as an objective fact precisely as one thinks of a metal or other object of physics or chemistry. Let us note that the psychology of this book as well as that of the *Textbook* and others is based upon a division of natural facts into two kinds, physical and mental, but in the present book (13), we detect a stronger note of objectivity,

although on the whole the objectivity is on a different level than in other books under review.

Turning now to a volume (3) whose author definitely proclaims an eclecticism, namely Breese, we find that in addition to an admission of behavior and action materials the writer intends to make consciousness completely persuasive of all psychological facts. In this matter he goes contrary to the traditional textbook in which the reflexes are presumed to be partially or completely distinct from control or connection with consciousness. The import of this attitude is, we believe, that the materials of psychology are being considered more as unitary objective facts.

To the writer it seems that this is a different state of conditions than the viewpoint represented in such a book as Münsterberg's (8), in which, while there is a very complete connection between neural apparatus and conscious states, there is still left over a complete series of psychological facts which are not subject to the same laws as hold in the domain of natural science facts. This contrast is marked, in spite of the fact that Münsterberg's action theory was meant to establish a thoroughgoing or mechanistic objective viewpoint.

We have already seen when studying the nervous system how Warren (13) makes consciousness objective by identifying it with neural functions. There are here symptoms of a marked inclination toward an objective psychology.

Smith and Guthrie (11) appear to us to indicate the development of a more objective position in psychology by relegating the discussion of consciousness to one chapter at the end of the book. They declare that psychology must be a science of behavior because of its greater exactness when interpreted in that way, but they would not, however, dispense completely with the discussion of consciousness because it still is a matter of interest.

As extreme instances of the objectifying tendency there are appearing textbooks which dispense with or appear to dispense with the conception of consciousness entirely. Or else they make that which is most popularly known as consciousness into an integrated factor in responses. Examples of this situation are to be found in Meyer (7) who treats of the psychological materials and facts as definitely objective responses of another person.

Watson (14) of course dispenses with the conception of consciousness as any separate thing different from the ordinarily objectively visible facts and gives the impression at least that he means to make

all the data of psychology consist of the actions of the body as a whole. At the same time this author rejects such terms as sensations, attention, etc., which have traditionally carried the significance of subjective as over against objective psychological facts.

V. Sensations

Besides the notable change in the general problem of consciousness we can clearly recognize a transformation in the treatment of some specific psychological topics, and especially is this true for sensations. Indeed we find here very remarkable variations which are indicated by the fact that sensations are made into actions more definitely than has ever before been the case. We have already referred to Titchener's (12) emphasis that sensations must not be looked upon as knowledge factors but as definite objective processes. Warren even describes language in terms of kinesthetic sensations and in so doing obviously makes sensations into motor and actional facts.

This statement about sensations being actions is of course matched by the psychologists who make ideas also into actions. This is a more definite attitude even than that which makes language into kinesthetic sensations. Now in this same connection the problem of imageless recall offers us eloquent testimony of the newer psychological trend. Ogden's discussion (9) of imageless thought suggests without doubt that even for the structuralist such action can be very definitely described in terms of behavior rather than in terms of sensory material. The same thing is true of Woodworth's (15) suggestion concerning non-sensory recall.

Woodworth, in this chapter on sensations, further exemplifies a more objective attitude toward these psychological processes. Not only does he very emphatically support the statement that sensations are responses but he takes cognizance of very recent experiments and discussion which tend very definitely to establish sensations as objective qualities of things. Thus he suggests that Henning's work will revolutionize the psychology of olfactory sensations.

Coming to Watson (14) we have a very precise attempt to make sensations into objective facts. As we might expect Watson prefers to make sensations consist of the operation of physical end-organs with possibly the addition of the neural and motor apparatus connected with those organs.

Meyer (7) makes no provision at all for the discussion of sensation in the way it is ordinarily done but rather handles the material

usually treated under this heading by way of describing the response of the psychological machine, called the " other one " to the spectrum, sound signal, etc.

To consider another specific topic we might mention the extremely factual treatment that Woodworth (15) gives to imagination, including as he does under this heading manual skill, construction and play. Also the discussion of emotions and perception by this author and others indicates the expanding objectivity we are trying to point out.

VI. Enlarged Scope of Textbooks

The enlarged scope of recent textbooks cannot fail to suggest the modified attitude we are tracing. Not only do the more recent books display a changing character in the way psychological facts are discussed but they also include types of facts which previously were not treated at all. For example, diverse kinds of learning in their various phases find a very large place in recent works. In fact, in some books, Woodworth's (15) for example, learning constitutes a prominent part of the total materials handled. Various phases of learning of a concrete sort even displace the older material on association of ideas in the chapter on memory and association. In our opinion this fact symbolizes a more matter of fact method of describing psychological reactions, for the enlarged scope of the books appears to be based upon a stimulus-response foundation. In some books, however, even an extreme emphasis of learning facts does not mean an enlargement of psychology's scope but rather only a change of attitude or emphasis with respect to the traditional material found in psychological texts. Such a situation is exemplified by Watson who replaces thinking, memory and all the other so-called mental processes by learning materials. That is, Watson does not enlarge the scope of his book but merely attempts to throw out the old subjectivism to make room for the new objective material. In this case the fact that he does not enlarge his scope in order to carry the traditional material along with the new, rather reinforces our hypothesis than weakens it.

We might also add that in general the newer textbooks attempt to bring out and stress the actions of the person; this is illustrated by an increased stressing of physiological changes and other conditions which influence behavior including the surroundings in general. Very much to this same point, namely the emphasis on responses in psychological discussion, is the introduction of Freudian materials. These materials are made use of in various parts of the textbooks;

for example, Woodworth introduces the discussion of psychoanalytic materials in his discussion of dreams, with the result that dreams are handled as any ordinary sort of behavior. They are made into concrete forms of responses rather than successions of states of mind as the traditional statement of dreams expressed it. Angell (1) makes use of Freudian conceptions in his discussion of thinking, and here again thought takes on more the form of responsive behavior than is ordinarily the case.

Brierly (4) in a very recent textbook makes her whole discussion center to a great extent around the Freudian factors. Her whole psychology turns about the problem of the wish and other psychoanalytic conceptions. We must repeat again that the enlargement of the scope of psychological discussions has tended very directly toward a behavior goal, with the consequence that such discussions are escaping from the confining walls of subjectivistic tradition.

VII. Conditions Contributing to an Objectifying Tendency

Briefly we might turn to a consideration of some of the conditions which are responsible for or correlated with this objectifying tendency in psychology. It is all the more necessary to try and point out such contributing conditions inasmuch as we may have already suggested that the mere adherence to a physiological viewpoint has not been especially conducive to the establishment of an objective psychology. The same thing may be true in the case of these other conditions, which we plan to point out. It is hardly possible to overestimate the great influence which the work of the physiologist on conditioned reflexes has had on the development of psychology. One of the fundamental points this work has brought out has been the emphasis on stimulus factors in behavior. In the first place, it was observed that the interesting thing about the behavior of an organism was the way in which the responses of that organism are attached to a stimulus and can be shifted from one stimulus to another. Or to put it in other words, it was observed that the responses of an individual could be attached to additional or conditioning stimuli. These observations resulted in the shifting of the attention of the psychologist from some non-verifiable cause or condition of behavior to the observable mechanism of coördinating an organism's responses with stimuli.

Possibly it is not too much to assert that when psychology comes to be fully and exclusively studied from such an objective standpoint as the treatment of the conditioned reflex suggests, then and then only will psychology have attained to a Galilean revolution in statement

and method. For was it not precisely Galileo's shift of interest and method from Aristotelian forces within a single body to the complex interaction between bodies which made mechanics into a definite natural science? Similarly, in psychology when we confine our observations to the interaction between bodies, in this case stimuli objects and responses, then we can organize a series of data which will be thoroughly objective.

A second very fundamental and fruitful influence upon psychological thought is the Freudian development. This movement we look upon as an influence from the field of abnormal behavior. The Freudians (we mean to refer to the general psychopathological movement) working with imperfect, dissociated responses hit upon a scheme referring those disordered responses to actual disrupting conditions in the lives of the patients. This resulted in the development of a viewpoint which stressed the problem of adaptation. The underlying method of the Freudian movement came to be thought of as readapting individuals to their external circumstances. To be sure, the Freudians themselves did not look upon their work in this light and their constant stress of the sex instinct and the "unconscious" meant that they were looking for the causes of abnormal action and were attempting to correct such behavior by operating upon some power, in most cases very mysteriously thought of as residing in the "unconscious" of the individual. In practice, however, the situation worked out otherwise. Even in the case of their most far fetched Œdipus complexes they attempted to correct the adaptations of a patient to some other person and in this manner very thoroughly manifested the value of a stimulus-response viewpoint in psychology. Possibly it is not unfair to say that in spite of the great opposition that the Freudian theory brought out in the minds of psychologists no question exists at all but that these same psychologists were thoroughly impressed with the importance of the new stimulus-response attitude which was developed. Possibly the fact that the two influences we are mentioning, namely, the conditioned reflex experiments and the Freudian development, came about at the same time, served to emphasize and support the objective psychological views that were being developed simultaneously with them. This point is manifest in the fact that some writers are attempting to work out the Freudian psychotherapeutics in terms of conditioned reflexes, the sex factors being made into responses which are conditioned. That psychologists are greatly influenced by the

Freudian attitude is manifest by the stream of Freudian suggestions that are steadily flowing into psychological treatises.

Possibly it would not be inappropriate to sum up our whole discussion of recent textbooks by saying that psychology is now more than ever receptive to various sorts of objective suggestion. Also we might add that this condition represents a general intellectual attitude. As a matter of current cultural history we might point out that there is a wave of objectivism (or realism as it is otherwise put) sweeping the whole intellectual sea. The development of objective psychology parallels the development of realism in ethics, in literature and in other fields. In other words, each of these different movements may be taken to be merely symptoms of a more or less general intellectual condition.

If our suggestion is correct that a thoroughgoing objective psychology, a psychology based upon definitely established stimulus-response interaction, would constitute a Galilean achievement in the field of psychology, we are of course far from believing or suggesting that any such transformation has been achieved. Let us repeat again that we have been constantly emphasizing merely what are apparent trends in psychology which point the way toward this objective goal, but fully as many signs there are that this goal is far from having been reached. In fact it is true that in some of the textbooks which exhibit the most radical attempt to objectify psychology there is at the same time a very strong current of subjectivistic materials.

To be really objective psychology must give up many ideas which it now strongly entrenches in its traditions and which while they linger must permanently prevent psychology from being a full fledged natural science. One of the outstanding of these traditions is the notion that psychology deals with some sort of power or process which manifests itself in action. This kind of force is most commonly exploited in the discussion of instincts. In such discussion this power is presumed to manifest itself in various kinds of unlearned actions or tendencies which shape the life and action of the person aside from any training or other conditioning contact with circumstances. Again, this power or force is presumed to operate through the possession by the person of some innate intelligence prior to any kind of training or development. Training for those who hold to this view is presumed to be merely the occasion of the operation of this power instead of being a process of its development. In still another way this force is employed in psychology and that is

by endowing the nervous system with all sorts of mysterious determining powers. Our point is that as long as these factless notions are operating in psychology there cannot be developed a definite objective science based upon the observation of actually existing interacting organisms and their stimuli. And so while we have unquestionably found evidences of a growing objectivity in the psychological books of the past decade, the persistent existence of the force conception to which we have referred makes it highly problematic whether the general run of textbooks even in the next decade will discover to us a truly objective psychology.

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A NOTE ON THEORIES OF LEARNING

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Discussion

A theory to have scientific value must fulfill at least two conditions which we may state as follows: First, it must picture to us what probably goes on in certain of the gaps between perceived successive processes that cannot be kept under direct continuous observation; that is, where observation is impossible, it must answer plausibly the question How? or What goes on? But it must, in the second place, give this answer in such terms or in such a manner that the hypothecated connection is susceptible of experimental test. If either of these conditions is not fulfilled the theory is not helpful to scientific progress, and in such a case it makes little difference whether or not it is true, if, indeed, truth or falsity can be ascribed to it at all. Often the statement of *what goes on* under certain conditions must be made in very general and indefinite terms, because of the lack of relevant knowledge; but the theory may still be valuable if it is susceptible of experimental verification and opens the way for more definite supplementary hypotheses as knowledge in the field increases.

The trouble with many of our theories of learning—which are designed to supply knowledge regarding the organic processes going on between the stimuli of certain situations confronted by the individual and the modifications in his responses effected successively by them—is that they have no scientific value, according to the above criteria. It makes no difference whether or not they are true from some standpoints. Such theories we can continue to incorporate in textbooks, as we are doing, and we may require successive generations to learn and pass examinations on them, only to teach in turn to other "learners"; but we get no real returns either in increased knowledge of psychology or in ability to control human nature. It has been encouraging of late to see an increased activity among psychologists toward answering the question, How are errors eliminated in learning so that the fittest acts, of all those brought out by the situations, survive in the form of definitely integrated responses known as habits?

This is probably one of the most important problems before our science. It seems to me that we understand fairly well how varied responses arise when behavior is impeded or obstructed, but we cannot answer the question just stated. We know, moreover, that when an animal is hungry or under the pressure of some painful stimulus or of some inner "drive," or instinctive determining tendency, it will persist in responses toward rather definite ends, whether consciously anticipated by it or not; *but we do not know* why it does not in successive trials under similar circumstances continue to repeat random, trial and error, responses characteristic of the first trial. That seems to be the real problem of learning to-day.

A recent experiment reported by Kuo,[1] from the University of California, divides unsuccessful acts into two classes, merely excessive acts and ill-adaptive acts. The latter are those which check or disrupt activity making toward consummatory reaction, or which bring physical punishment, while the former class are those which merely delay the consummatory act. Kuo experimented with rats in a simple multiple choice apparatus with four compartments, of which one "led the animal to the food box by a short path; another, by a longer path; another confined the animal for a period of time; and a fourth provided an electric shock punishment." Entrance to the second of these compartments was assumed to illustrate excessive acts, while entrance to the last two constituted ill-adaptive acts. It is further assumed "that the electric shock was more ill-adaptive than confinement." Hunger was the primary motive used, and five trials were given each animal daily. Punishment by confinement lasted twenty seconds, and that by electric shock was severe enough to "make the animal squeal every time and immediately jump back from the compartment."

Results show clearly that electric shock is most effective in the elimination of unsuccessful movements, confinement coming next. The long path compartment was eliminated very slowly by all but two rats. *"And in many cases the shifting from the long path compartment to the short path compartment came about suddenly and in spite of frequency."* Two of the rats eliminated the short path early in the experiment and continued to follow the long one. It is concluded "that frequency and recency as such have very little to do with the matter of elimination in this experiment."

[1] Kuo, Z. Y. The nature of Unsuccessful Acts and Their Order of Elimination in Animal Learning. *J. of Compar. Psychol.*, 1922, 2, 1–27.

Various theories of selection and elimination in learning are reviewed and criticized—(1) the pleasure-pain theory, (2) the confirmation and inhibition theory (Hobhouse); (3) the congruity theory (Holmes), (4) the completeness of response theory (Peterson), (5) the intensity theory (Carr), (6) the frequency-recency theory (Watson), and (7) the drive or motor-set theory (Woodworth, Perry, Tolman). The names given in parentheses are those used by the author, who makes little attempt to see similarities and to trace historical developments of the theories or to analyze them. All but the last named of the theories are dismissed as being only descriptive of the facts and not explanatory, while the last is accepted *in toto* apparently as explanatory, the author overlooking the fact that this theory fails to show the neural mechanism of learning or to suggest why an act is eliminated and not repeated in successive trials. The question of learning is not essentially one of how the animal persists in the activity till it reaches the consummatory act, this being a different problem though somewhat closely related to learning; the real question concerns the mechanism of elimination. This fact is clearly evident in the theories rejected by Kuo as "merely descriptive." It is important to emphasize this point in order that experiments may be directed at the real crux of the problem. It is probably admitted by all investigators now that the inward "drives" to behavior, of which the consummatory reactions are an expression, are not faculties with arbitrary powers but metabolic changes, internal secretions, interstimulation of various part processes in the organism, etc. These factors serve to make the organism react selectively to certain of the numerous exteroceptive stimuli, but how do the erroneous responses—errors from the standpoint of the consummatory act—become suppressed and eliminated? It is the *how* of which we are yet so ignorant, and ignoring it is no solution of the problem. The pleasure-pain theory is hardly stated in scientific terms according to the criteria mentioned in a foregoing paragraph. The same thing is true of the "law of effect," so frequently utilized by some writers; it does not get at the *how*. The inhibition theory assumes what is to be explained. The intensity theory needs more clarification, and it probably reduces, so far as intensity of response is concerned, to some sort of consistency or congruity conception. The frequency-recency theory is susceptible of experimental investigation of a definite quantitative nature, and in the light of the accumulating evidence it is becoming apparent that frequency-recency factors are in themselves but fixing, not selective, agents in learn-

ing; that they tend to fix wrong as well as right responses. Several writers have seen this clearly and various drainage theories have been attempted, but the chief difficulty has been in most cases that the theories have not been amenable to experimental test.

As the sponsor to one of the theories rejected by Kuo as descriptive, I wish to point out that this author has apparently overlooked the two experimental studies supporting the completeness of response theory.[2] The second of these articles analyzes quantitatively the merits of the frequency-recency theories of learning. My own results agree entirely with those of Kuo, but this author seems to miss the nucleus of the difficult problem of learning. The congruity theory seems to be going in the right direction, and I acknowledge much help from its early statement both by J. M. Baldwin and by Holmes; it places the emphasis on the relative consistency of the several impulses to action. This is what I have aimed at in the completeness of response theory, suggesting that the advantage lies with the impulses which give the individual—or the dominant determining tendencies, if this is preferred—the completest expression. It seems to me, however, that to account for the inhibition of the "ill-adaptive acts" we must assume some sort of overlapping of the several stimulus effects so that they can operate simultaneously; and this view certainly has much support from observation—both objective and introspective—of the higher deliberative acts. There is nothing in the motor-set theory accepted by Kuo that is inconsistent with this conception or new to it, but it does not go far enough to meet the real issue. I find much that is good in the motor-set conception of behavior, and accept all of it so far as I know, but cannot regard it as a theory of the selection phenomena in *learning,* though it may explain selection in response.

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SPECIAL REVIEWS

S. Smith & E. R. Guthrie. *General Psychology in Terms of Behavior.* New York: Appleton, 1922. Pp. xii+270.

The authors say in the preface that "an attempt is made to state in terms of behavior the facts and principles of general psychology. The facts set forth are those which lead the student to a systematic explanation of his own conduct and that of his fellows." Not all writers who have in the past promised to state "psychology" in terms of behavior have fulfilled their promise. Smith and Guthrie really do what they promise. The seven chapters of this book, comparatively small and yet full of content, are entitled "The Elements of Behavior, Instinct, Learning, Coenotropes, Perception, Human Motives, Social Psychology."

It is the business of a reviewer to state his difference of opinion where the matter concerned seems important; but that must not be interpreted as belittling the value of the whole book, which will prove to be an unusually valuable text.

The authors say (p. 4) that "along the nerve structures pass *nervous impulses.*" The reviewer believes that nervous functioning is of the nature of *streaming,* that the term "impulse," suggesting something momentary, is for that very reason very misleading and ought to be especially avoided in the introductory teaching of psychology. The authors say (p. 5) that "The great number of neurones and the complexity of their connections account for the fact that an impulse leaving a particular sense organ may find its way to one group of muscles at one time and to another group of muscles at another time." The reviewer believes that this fact can not be explained ("accounted for") by the mere use of the vague term "complexity," that it would be compatible even with relative "simplicity." Further, "Accommodation for near vision gives us a sensation of muscle strain. In distant vision and dim light such sensations are practically absent" (p. 11). The reviewer feels compelled to conclude that both authors are "far-sighted" and therefore do not know better.

All actions are classified by the authors so far as "external" actions are concerned under three groups as (1) orientation, (2)

locomotion, and (3) intervention. "Man, by means of his elaborate intervention responses, so constructs the world about him as to lessen his dependence upon movements of orientation and locomotion, with a resulting increase of convenience and safety." The reviewer would go a little further than this *mere three-fold* division. The authors add, then, two "internal" responses, (4) "movements of visceral muscles," and (5) "glandular secretions." The authors use this occasion for talking of "emotion" in the traditional way (p. 37): "*Emotional* expression is made up of *overt* bodily movements *and* of characteristic *internal* responses accompanying them." The reviewer asks if anyone knows of any (more than momentary) life activity whatsoever, emotional or unemotional (blacksmithing, for example), that is not so made up. When will psychologists come to recognize that a distinction between emotion and other action cannot be based on the *ever present* internal secretions? But why distinguish at all? Is it really necessary for psychology to talk of emotions just because poetry talks of them?

The authors deserve much praise for making it thoroughly clear in their text that "the instincts of babies are more numerous and less complex than are the instincts of the young of other species. . . . The elaborate instincts of lower animals . . . in man all are learned." Whether the emphasis placed by the authors on the distinction of "precurrent and consummatory" responses is equally praiseworthy, the reviewer is not so sure. "The final response that removes the maintaining stimuli is called a consummatory response." One example given by the authors is this: "When the trail is lost, the dog is left with an abortive tendency to respond to an odor stimulus." To the reviewer the authors have not made clear what that "abortive tendency" in consummatory responsiveness is. Is it something (yet unknown to psychology) which now steps in and plays the rôle of "the maintaining stimulus"? It looks, further, as if the dog's *last* (*unfortunate*) *jump* (the final response) which did break the trail were in accordance with the authors' definition "the consummatory response." Unless we introduce teleology it must be so. Further, is it really true that food seeking is always terminated by eating? In the squirrel, in the honey bee? Combat always ends when the foe is routed? It is never ended by both parties before? And it is only in the mythological Battle of the Huns that the fighting motions continue even afterwards? The notion of the consummatory response *ought not to be overemphasized*. However, the treatment as given by the

authors has pedagogical value even though it may lack the explanatory feature. It is certainly true, as the authors say (p. 64), "that the consummatory response in any chain reflex is a convenient basis for classifying instincts." They classify *animal* instincts ("in the case of man, these utilities are served for the most part by learned acts") under five heads: Swallowing Food, Copulation, Securing Shelter, Defeating Antagonists, Cleanliness.

"Psychology," the authors rightly say, "must explain how habits are developed." They explain it in the following two-fold way: (1) "Through use, the tendency of a response to follow its stimulus becomes better established." The reviewer does not believe that that is a general truth. Do all our original reflexes, daily exercised, become better and better established all through life? Do we sneeze the better the older we get? He has stated his own opinion elsewhere, in his own textbook, also years ago in his book on "Behavior," properly distinguishing between lower and higher centers. (2) "The conditioned response.—How may a response be provoked by a new stimulus?" The reviewer holds that this second "law" of habit formation is the only one that really exists, but that it includes, in a certain limited sense, the fact mentioned under (1), although that first fact, plain and simple, is not a law of habit formation. The "explanation" of habit formation, as given by the authors, seems thus to the reviewer a little too superficial, lacking a penetrating analysis of all the factors. Still, this superficiality is a usual feature of virtually all psychology texts and should not be held out against this one in particular.

"Habits which men universally share, we call coenotropes. They are the products of original nature and commonly shared environment." Example (p. 146): "Everybody knows how to use a stick as a weapon, but no one does so instinctively." Under coenotropes the authors discuss also play, which they call both an "impractical" conduct and also "an incomplete act given in response to an incomplete situation." The latter, the incompleteness, does not seem to the reviewer an essential characteristic of what anybody would call play. The play with a high-powered automobile, for example, not infrequently completes a whole life circle. And kissing games are not always, contrary to what the authors (p. 152) tell us, supervised by adult chaperones. On the other hand, the fox in the fable, when he finally ceases to jump at the grapes hanging too high, cannot, because he never consummates the feast, be said to be playing. Does he mean to call himself a playful animal when he pronounces the

grapes sour? That is another question. The authors must be praised, however, for making it clear to their readers that play is not a specific sensori-motor function, but that any and all sensori-motor functions may become acts of play.

Under "Perception" the authors discuss examples of the most important habits, from the simplest to those which go under the names of judgment, conviction, and belief. Under "Human Motives" they give the student a good idea of the meaning of a "delayed reaction" and of "volition." The chapter on "Social Psychology" makes very clear the fact that all social habits are accidental and not a natural part of a human being's equipment. An "Appendix" gives a brief, but quite comprehensive account of the "conscious" states for the benefit of those many who believe to be unable to get along without them in psychology.

If the reviewer had not written his own textbook, which naturally suits his own views more completely, and if then he had to select a textbook for a beginners' course in psychology, this one of Smith and Guthrie he would unhesitatingly select in preference to all others on the market. Indeed, if he had to give a *very* abbreviated course, he would prefer this to his own. The authors have successfully omitted most of the "traditional, but unnecessary detail . . . and the blind alley topics, an acquaintance with which has been considered a polite accomplishment in psychology."

MAX F. MEYER

UNIVERSITY OF MISSOURI

R. S. WOODWORTH. *Psychology, A Study of Mental Life.* New York: Holt, 1921. Pp. x+580.

The reviewer, whenever he sees a new psychology text, approaches it with the following questions: (1) How does the author delimit his field? In other words, how does he define psychology? (2) How does he subdivide his field? What categories does he use for chapter arrangement? (3) Is the author's endeavor mainly descriptive or mainly explanatory? And if explanation plays the dominant or at least an important rôle, what are the principles (laws, hypotheses) of explanation?

(1) Woodward separates psychology from *sociology* by the following distinction: "Sociology studies the activities of a group of people taken as a whole, while psychology studies the activities of the individuals." (The reviewer would prefer the distinction by

reference to "institutional life.") He separates psychology from *biology,* or more especially from *physiology,* by saying: "Psychology devotes itself to desire, thought, memory, and such 'mental functions,' while physiology concentrates its effort upon 'bodily' functions." He adds that this is only a rough distinction, which breaks down at many points. The reviewer rejects this distinction as not being an objective one; and yet may be preferable to a certain objective, but unreal, distinction which a certain group of psychologists is trying to popularize, holding that psychology studies "the whole *animal,*"—as if a physiologist would dream of studying, for example, the liver *without* reference to its service in the *whole* animal. The real distinction has been emphasized perhaps first by Miss Calkins: Everything psychological has a *social* significance.

"We do not find any clean separation." Therefore Woodworth concludes that "it would be correct, then, to limit psychology to the study of conscious activities and of activities akin to these. But to say, as used to be said, that psychology is purely an introspective science, making use of no other sort of observation, is absurd in the face of the facts." So he finally adopts the following definition: "Psychology is the science of the conscious and near-conscious activities of living individuals." (He thus expressly excludes the souls of the dead.) To the reviewer it appears a matter of great regret that Woodworth in this textbook, which will undoubtedly have a great influence on the growing generation of psychologists in this country, did not succeed in freeing his definition from all reference to the conscious.

(2) The author seems to have conceived his twenty chapters (apart from the introductory) in four divisions, if the reviewer is a good mind reader. Each of these divisions consists of a first part in which objective facts predominate in the discussion and a second in which introspection plays its traditional rôle. Into the first division (but this is only the reviewer's impression) fall chapters II to IX. The more objective facts are related in the chapters II to VI under the terms "native and acquired traits, reflexes, and instincts." But in the chapters VII to IX, "Emotion, Inventory of Human Instincts and Primary Emotions, The Feelings" we are constantly reminded that psychology is the science of the *conscious* activities. The treatment is excellent provided we adopt the author's definition of psychology. And there is no doubt that the larger part of the public for aid in psychology teaching still adopt that definition or a similar one.

The second division seems to consist of the chapters X, XI, XII.

The tenth chapter discusses the functions of the sense organs on fifty-seven pages. The subjective side then finds its dominating treatment in chapters XI and XII under "Attention" and "Intelligence." The author lays down the following six "great laws of attention," *the law of selection, the law of advantage, the law of shifting, the law of tendency, the law of combination, the law of degrees.* All these laws, however, are treated in a descriptive rather than in an explanatory manner,—as qualitative rather than as quantitative and truly scientific experiences. The chapter entitled "Intelligence" concerns itself chiefly with the Binet tests.

The third division, as the reviewer sees it, includes chapters XIII to XVII. The thirteenth chapter "Learning and Habit Formation" tells of the objective facts of the modifying process undergone by native reactions. The causes which "detach a response from a stimulus" are said to be three: "pain" or "failure" or "negative adaptation." However true this enumeration of the causes may appear superficially, the reviewer can not help saying, in passing, that he does not think highly of these "causes." To one accustomed to the explanations of the mathematicophysical sciences, those causes are hardly an "explanation." They are a qualitative description. The subjective side then plays its prominent rôle in the chapters "Memory, Association and Mental Imagery, The Laws of Association, Perception."

The fourth division begins with an objective statement to the effect that "reasoning" is a kind of "exploration" of a situation. But the statement is not analyzed either extensively or, to the reviewer, quite convincingly enough. Is "exploration" not adopted here because this term is so strongly "subjective" and therefore so much more pleasing to the average reader than a more strictly objective term? The "*conscious* behavior" standpoint overwhelmingly dominates the last four chapters, "Reasoning, Imagination, Will, Personality." The nineteenth chapter, "Imagination," treats first of "mental manipulation," but the reviewer did not succeed in understanding what idea of "mental manipulation" would be exactly conveyed by this chapter to the average reader or student. It further treats of "play," but the reviewer did not succeed in convincing himself that the author attaches any definite meaning to the term "play" in spite of the rather important rôle it plays in the text. The author's intention seems to be that of using the term "play" eclectically, so that no school of theorists can fail to find at least some of its own views about play in the treatment offered.

Maybe the reader of this review will be helped by a quotation (p. 492): "Play gratifies many instincts, not merely a single one. Further, it is very doubtful whether the whole satisfaction of play activity can be traced to the instincts, anyway, for play may bring in the native 'likes and dislikes,' which we saw to be irreducible to instinctive tendencies; and it may bring in acquired likes and interests developed out of these native likes. Play gives rise to situations that are interesting and attractive to the players, though the attraction cannot be traced to any of the instincts. The rhythm of dancing, marching, and of children's sing-song games can scarcely be traced to any of the instincts." The reviewer would certainly in every single case trace them thus and thereby get rid of the term "play" entirely.

The same chapter "Imagination" treats of daydreaming ("it is a sort of play"), worry ("fear daydreams also include worry"), nightdreaming ("it seems likely that dreams are like daydreams in affording gratification to desires"), Freud's theory of dreams, autistic thinking, invention and art. The twentieth chapter teaches (p. 528), that "*voluntary* action occurs when you realize the situation and are definitely *conscious of yourself*." The twenty-first chapter discusses personality as either integrated or partially dissociated, further the self, the unconscious and the subconscious.

(3) The book is a most excellent compilation of a mass of material much larger than what can be taught the average student in any single psychology course even throughout the year. But many teachers do not mind that. The reviewer understands readily that the average teacher will be captivated by its clear and *entertaining* style,—captivated even to the extent of concluding (as at least one psychology teacher has publicly done), that the author's treatment has "harmonized thoroughly the rival claims of introspection and behavior for the major part of psychology." The reviewer does not share that rash optimism. While congratulating the author on the very high literary merits of his book, he cannot abstrain from expressing the opinion that this book has established no such harmony and that it is likely to have (obviously has already had) the regrettable effect of clouding the issue, in spite of the fact that the author does emphasize that "*mental* processes of all kinds *are reactions*" (p. 67).

It seems to the reviewer that Woodworth's text is mainly descriptive, and that the explanatory features, very naturally always less popular with the average reader or college student, have been sacrificed,—not absolutely, but relatively, that is, in being overshadowed

by the descriptive features. For instance, "a reflex may come to *be attached* to a new stimulus" (p. 298). "Voluntary control includes the *ability to omit* a response" (p. 298). "*Detachment of an impulse or emotion* from its natural stimulus is very much in evidence" (p. 299). "Man *may observe* that the dinner bell means dinner, whereas the dog does *not observe*" (p. 303). "Man *learns by* impulsively doing in some instances, by rational analysis in others" (p. 313). The reviewer quotes these few examples in order to illustrate his view that traditional description prevails; he has looked in vain for "explanations" of these descriptive facts. Perhaps it was excusable and even wise thus to place the relative emphasis, in order to reach a larger audience. Does not even Watson, who is regarded by many as "the" radical behaviorist, include in his textbook a chapter on "emotions" justifiable and justified by nothing but the fact that such a chapter has always been included in the traditional and subjective "psychologies"? Nevertheless, is it not time for psychology to get out of that condition in which (descriptive) botany and zoology found themselves forty years ago?

MAX F. MEYER

UNIVERSITY OF MISSOURI

JAMES SULLY. *My Life and Friends: A Psychologist's Memories.* New York: Dutton (no date). Pp. 344.

G. STANLEY HALL. *Recreations of a Psychologist.* New York: Appleton, 1920. Pp. 336.

MARGARET MÜNSTERBERG. *Hugo Münsterberg: His Life and Work.* New York: Appleton, 1922. Pp. 449.

Unlike medicine and law, psychology has made little use of the case method except in psychoanalysis. But even the orthodox psychologist may at times derive profit and pleasure from a study of the individual, particularly when that individual is himself a psychologist. In reading the *Letters of William James* one is struck most of all by the vivid picture of the author's personality. To many of the younger generation the name of Sully, Hall, or Münsterberg represents merely a textbook or a footnote reference. In the three volumes before us these three pioneer psychologists are revealed as living personalities.

James Sully's *Life and Friends* is a chatty narrative, written in easy, attractive style. The first part gives a life-like picture of the author's life from childhood on. The story is told quite objectively. In fact it is too objective at times; for we can only guess at the

progress of the author's mental unfolding. Even the inner conflict which must have preceded his change of career from preacher to philosopher is barely touched upon. His romance is compressed into the brief statement, "In 1868 I married." Now and then we glimpse some personal clash, as when Sully's candidacy for Bain's chair at Aberdeen was rejected and an obvious amateur appointed. The marked success of his *Outlines* and his eventual appointment to the chair of philosophy at London are narrated with no trace of emotional coloring.

It is interesting to note that up to the age of fifty Sully was a professional free-lance, having no university connection except as examiner and occasional lecturer, and that much of his best constructive work was accomplished before this time. To those of us who regard him as first of all a psychologist, it is a surprise to discover how much of his time was devoted to other branches, including "pure literature." The writer tells us that the leading motive which led him to undertake his *Outlines* was a desire to present the psychology of Bain, his master, in more readable form.

One of the great charms of the book is its picture of the author's social intercourse with his friends, including such well-known figures as Leslie Stephen, G. H. Lewes and George Eliot, William James, Darwin, Spencer, Meredith, and others. Under the captaincy of Stephen a group called the Sunday Tramps were accustomed for years to ramble together once a fortnight, and many interesting anecdotes are told of their adventures and sayings. In the latter part of the book some of these intimates are described and characterized in a sketchy, off-hand way.

In many places the author reveals his subtle sense of humor. One can appreciate Sully's surprise in his proof-reading days at finding that he had twice passed over the expression, "Arabian Knights." We can sympathize with his perplexity when a girl student asked him to explain an obscure passage which she read aloud from a book; to gain time he asked her the title of the work, only to be informed that it was "Sully's Outlines."

Stanley Hall's *Recreations of a Psychologist* does not aim to be autobiographical, but two of the shorter sketches are admittedly personal, and elsewhere one discovers thinly veiled traces of the author's personality.

The longest story in the volume, *The Fall of Atlantis,* may be regarded as Dr. Hall's conception of the history of human civilization—a gradual progress upward to a stage of ideal perfection,

whereupon, through the working of certain inherent tendencies, it is swept downward to destruction. Interesting the narrative is, despite its many technical details and unfamiliar terms. Yet there is a tinge of unreality in the picture, owing perhaps to the fanciful setting; for in the story the great continent sinks beneath the Atlantic waves in a few brief months, instead of the myriad or million years which geological processes seem to demand.

To the psychological reader the most interesting portion of the book is the *Note on Early Memories.* Quite recently the author revisited three of his boyhood homes for the purpose of testing his capacity to evoke long-forgotten scenes and episodes. His description of the gradual unfolding of these recollections under the stimulus of the old environment is a fine piece of psychological analysis. Those who know the author only as a dignified scholar or revered teacher will be particularly pleased with the intimate details which abound in this study and in the more sprightly sketch, *Getting Married in Germany.*

The account of *Hugo Münsterberg: His Life and Work,* by his daughter, completes the trilogy. It is at once pleasing and disappointing. The earlier chapters make delightful reading. They give a life-like picture of the youthful Münsterberg amid his home surroundings at Dantzig. In the later chapters the traits of Münsterberg's personality are obscured by elaborate details of his work and the story is overweighted with letters of friendly appreciation from colleagues. In fact the personality of William James, exhibited in many letters scattered through the book, stands out in sharper outline than the personality of Münsterberg.

Historically the insertion of these "testimonial" letters is easy to understand, if we recall how Münsterberg suffered in the end from the virulent passions engendered by the war. Yet those who knew the charm of his singular personality will deeply regret that the biographer did not include more of his sayings and bring out more vividly his genial sociability on informal occasions. The reviewer recalls especially one evening gathering at a meeting of the Psychological Association soon after Münsterberg came to America. Professor Caldwell had delighted the crowd with a number of comic songs; then there were loud calls for Münsterberg. Wreathed with a broad smile our new colleague arose, and suggested that after the funny songs it was fitting that we should "want to hear the funny English." The audience was completely captured at once.

That Münsterberg was a prime factor in the early development

of psychology in America needs no demonstration. What the younger generation may not appreciate is the unusual mingling in his make-up of genuine greatness and childish naïveté. The latter element is not merely of special psychological interest. It goes far toward refuting the political aspersions which embittered Münsterberg's last years.

HOWARD C. WARREN

PRINCETON UNIVERSITY.

G. M. STRATTON. *Developing Mental Power.* Boston: 1922. Pp. 72.

As stated in the editor's introduction, the purpose of this monograph is to help settle in the teacher's mind the long-argued question as to the relative importance of special mental faculties, and the transfer of training. The method of such settlement consists in restating the evidence of both sides and then presenting a greater and wiser philosophy which seeks to harmonize all evidence to the great joy of all educators everywhere.

If one reads the evidence carefully, there lurks a suspicion that at least one school of thought is not treated as impartially as the other, and if one forget for a moment that a new theory is being advocated, he finds himself reading a defense of the other partially disguised under new words. For example, we read that "The experiments in clear support of this doctrine, however—that you train merely what you train—are few; most experiments contradict it" (p. 12). Citation of the contradictory experiments is meager, and in just what manner the experiments fall short of proving the point is left to the imagination. Under equally general terms, the results of experiments to the contrary cited on pages 32 and 33 present no statistical data so that we may judge for ourselves just how great the improved scores were, and so unfortunately we cannot decide for ourselves to what extent the contradiction and refutation are complete.

The later chapters then gradually digress on to the general topic of development and training of the will, instincts, and emotions. If the reviewers do likewise and also forget what the arguments were originally, the answer to these highly inspirational statements is very obvious. It involves the historical development of the course of study when education was selective, fitted to a limited class of superior minds preparing for the professions. When education became universal, educators knowing little about the limitations of

intellect merely attempted to give all pupils the same course. The assumption was that whatever had been good for the few must be good for the mass. The struggle which the average and dull mind makes in attempting such tasks is pathetic, and not inspirational to themselves nor to others. Yet we are advised that "the interest in these general truths is, in a sense, less natural, more a matter of *civilization,* and has to be *imposed* upon the child by a kind of contagious interest felt by *another who can see* the endless applications of what is universal" (p. 25, but italics mine). Only minds of the greatest intellectual development and capacity are capable of understanding the abstract. The limited few achieve such goals of themselves and with less assistance from *another who can see* than that "other" will ever know. There is no argument that such tasks, when fully comprehended and understood, do strengthen the will, and develop character.

The inconsistency of the monograph consists in part in not recognizing the facts of intelligence and pointing out to teachers that thousands of pupils fall short of that masterful development in themselves because they are unable to master the tasks set before them. The teacher who follows the advice set forth therein in the blind manner which is suggested fails to reach such goals, and in the failure she loses some of that force of character and blames herself unjustly.

The reviewer believes firmly in the duty of the school in developing the desirable virtues. He believes that they may be realized only by struggling to the *successful* completion of tasks with the comprehension of the pupils. Such a program calls for trained minds, free to undertake research to determine just what pupils can actually do. Yet we are warned that "the cry for special training is a cry also for specialists as teachers; and desirable as they are, they will bear watching . . . with specialists it is touch-and-go with their pupils" (p. 68). Immediately thereafter we read that the city school offers little of that leisurely contact with pupils which is so important. Statements in full by the modern city teacher and by the "archaic" teacher as to their knowledge concerning their pupils would be most wholesomely in order at this point. Carried thus far, the argument is absurd, but the buffoonery of the following makes it conclusive: "An erect mind knowing the salient things will do more to quicken and give a right facing to other minds than will a dozen husks of humanity with the entire alphabet in capitals after their names" (p. 69).

One wonders how actually "In the World War, men and women who had before been working to their *utmost*" were able to meet the demand of a trebled task. Finally, in complete consistency with the idea of general powers, one is forced to imagine that the references and index have been printed, since none appear in the monograph.

HARRY J. BAKER

DETROIT PUBLIC SCHOOLS

C. B. THOMPSON. *Mental Disorders.* Baltimore: Warwick & York, 1920. Pp. 48. 75 cents.

This brochure is of value in giving a brief account of mental disorders, both for those who do not need the more extended treatises, and as a kind of syllabus for students in connection with lectures or clinics. The subtitle "briefly described and classified, with a few remarks on treatment and prevention," aptly characterizes the work. In addition to the general descriptions space is found for brief accounts of cases as illustrations of general statements. Symptoms are explained as "comprehensible to us if we could see clues to the workings of the individual's mind," and the patients might be set straight by psychoanalysis by tracing back the "thoughts to the deeper motives from which they have sprung . . . the emotions and instincts underlying our behavior."

SHEPHERD IVORY FRANZ

ST. ELIZABETHS HOSPITAL

L. J. MARTIN. *Mental Hygiene: Two Years' Experience of a Clinical Psychologist.* Baltimore: Warwick & York, 1920. Pp. viii+89. $1.40.

Some of Miss Martin's experiences as a consulting psychologist in San Francisco are detailed in this book. They show, so far as San Francisco and the neighborhood are concerned, that the need for psychological consultation, as distinct from psychiatric consultation, has been felt by the community, medical and lay. They also indicate a similar need in other parts of the country for corresponding psychological consultants.

SHEPHERD IVORY FRANZ

ST. ELIZABETHS HOSPITAL

A. J. Rosanoff. *Manual of Psychiatry.* (5th rev. edit.) New York: Wiley, 1920. Pp. xv+684.

This successful text is now in its fifth edition, considerably enlarged and modified. The reviewer recommends it to psychologists, not as above or beyond criticism, but in spite of a number of defects. Psychiatry is defined as that "*branch of neurology* which treats of mental disorders," etc. The mental disorders are said to be characterized by *insufficiency* and *perversion.* Perversion is not defined, except incidentally in other sections of the book in which particular perversions are described. In all cases the reviewer has noted he finds it possible to describe the perversion as a combination of exaggerated or diminished sensations, feelings, and activities. This special matter is mentioned, since it illustrates a patent defect in psychiatry. Symptoms are described in general terms, frequently in terms with popular meanings and this lack of analysis tends to lead to continued misconceptions. The book contains descriptions and discussions of many special topics, frequently omitted from textbooks of psychiatry. Mention of a few of them will serve to indicate the broad scope of the work: applications of psychology in psychiatry; psychoanalysis; applications of sociology in psychiatry; normal course of mental development; Stanford revision of the Binet-Simon intelligence scale; free association test (Kent-Rosanoff); standard psychological group tests. An excellence of the book is the unusual number of references to French psychiatric literature.

Shepherd Ivory Franz

St. Elizabeths Hospital

E. K. Strong, Jr. *Introductory Psychology for Teachers.* Baltimore: Warwick & York, 1920. Pp. xiii+233.

Professor Strong has put between the covers of this book, not so much a text for a course in psychology, as a course itself. Everything the student is to read and think about it carefully set down. There are also directions as to just *when* all these things are to be done. The instructor using this volume will find that practically the entire task of organizing materials has been accomplished for him.

The contents of the book were chosen because of their interest and because of their applicability to concrete matters, especially those of education. The work is divided into three main sections. The first of these presents the fundamental aspects of the learning process; the second deals with individual differences, both innate and

acquired; and the third covers in a very schematic way the nervous system, sensation, and space perception. In the first of these sections, especially, the influence of Thorndike is evident. The choice of materials and the terminology show this.

A student who works through this book should achieve an ability to think of human nature quantitatively. There is a wealth of material in the illustrative data and in the results of the prescribed experiments to insure this happy end.

There are, of course, arguments against the over-organization and over-simplification of materials for class use. Where time is available, and where a scientific attitude can be developed, there is some advantage in giving students an opportunity to plunge into the midst of the abstractions that are the life of any science. But where immature students must be put into contact with as many *useful* facts as possible in a very brief time, a highly organized collection of lessons such as Professor Strong has put together should prove a blessing to instructors.

EDWARD S. ROBINSON

UNIVERSITY OF CHICAGO

NOTES AND NEWS

Dr. Herman H. Young, who this year has been at the University of Pennsylvania, has been appointed associate professor of clinical psychology at the University of Indiana.

Dr. Calvin P. Stone, of the University of Minnesota, has been appointed assistant professor of psychology at Stanford University.

We have received the first number of the *Journal of Personnel Research* published by the Williams and Wilkins Company, Baltimore, with Leonard Outhwaite (Personal Research Foundation) as editor-in-chief, and Clarence S. Yoakum (Carnegie Institute of Technology) as managing editor, and nine other members of the editorial board.

Professor E. Kraepelin has asked to be relieved from delivering the course on psychiatry at the University of Munich, as he wishes to devote all his energies to research on psychiatry at the special institution for this purpose, which is practically his creation.

Dr. W. H. R. Rivers, of the University of Cambridge, died on June 4th in his fifty-eighth year.

At the University of Kansas, Dr. Curt Rosenow has been promoted to the rank of associate professor in psychology and Dr. Hulsey Cason has been appointed assistant professor in psychology.

At the meeting of the American Psychological Association at Princeton in 1921, there was constituted a section of consulting psychologists to represent persons able to carry on the applications of psychology at a recognized scientific level. Up to the present, the membership in this section has been restricted to members of the section of clinical psychology. Applications for membership to the section of consulting psychologists can now be received from all members of the American Psychological Association who are engaged in the applications of psychology. The committee in charge will act upon these applications at the next annual meeting of the Association. For further information address the representative of the committee, Dr. F. L. Wells, 74 Fenwood Road, Boston, Mass.

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THE PSYCHOLOGICAL BULLETIN

1. GENERAL

544. VOLLENHOVEN, T., Einiges über die Logik in dem Vitalismus von Driesch. *Biol. Centralbl.*, 1921, **41**, 337–358.

Verteidigung des Psychovitalismus gegen Driesch. Hauptergebnis: der gegenwärtige Stand der Biologie erfordert nicht, dass ein besonderes Erklärungsprinzip für sie eingeführt werde. Sie kann sich vielmehr teils auf die Physikochemie teils auf die Psychologie berufen. Ersteres bei statischteleologischen, letzteres bei dynamischteleologischen Problemen.

ZUR STRASSEN (Frankfurt a/M)

545. LITTLE, C. C., The Relation between Research in Human Heredity and Experimental Genetics. *Sci. Mon.*, 1922, **14**, 401–414.

J. F. DASHIELL (North Carolina)

546. SCHILLER, F. C. S., Mr. Russell's Psychology. *J. of Philos.*, 1922, **19**, 281–292.

The writer is not moved by a hostile spirit in discussing Mr. Russell's Analysis of Mind, for he has many points in common with the writer of that book. This book represents a movement in the direction of coöperation on the part of philosophic sciences, and this means some degree of concession making with the various forms of investigation of to-day. Just to say that even Behaviorism, Psychoanalysis, or Psychical Research "shock our prejudices" is not sufficient argument against their claims. At least philosophy should recognize the need for coming to terms with psychology.

The unfortunate fact about Mr. Russell's method is its atavistic character, a reversion to a type which should never be revived. The main features of this psychology are (1) its highly pluralistic data,

and (2) its attitude of extraneous observer using a method of abstract analysis searching for the elemental, and both of these assumptions are so plausible because of their being derived from common-sense prejudices, or at least from their agreement with these.

The analysis brings out the entities which compose these pluralities, but we quickly convince ourselves that this datum of common sense, of Hume and of Russell, is not present in the original experience but only a thing constructed by philosophic reflection. The method used merely assumes the elemental character of the plural data, because being plural it must have elements, and this may be possible because he takes no concern for the actual course of development of mental process. He forgets to take into account the forerunners of these mental facts, for he takes an adult mind and rearranges its content systematically, and for that matter esthetically. And just at the moment an analysis is required to fit into other than esthetic conditions, and is required to conform to the facts of psychic development, then it is no longer a matter of indifference as to standpoint, *i.e.* subjective or objective.

The fact is no mind may be considered as constructed out of "elements" if it is a viable thing. Hume despairs of uniting the elements or at least of explaining how it is done. Kant never saw clearly the relations between his epistemology and psychology. Russell skips over such questions as to how "forms" can be made to fit in with the "matter" of sensation, etc. To him the "subject" is fictitious. It is merely the ghost of the subject. The fact is the dichotomy of experience into psychical and physical is a mere artifice or a fiction, and Mr. Russell's account of sensations and images gives us an opportunity to suppress these fictions. The activist theory can provide for plurality if it does not destroy unity. It sees to it that our psychology permits of psychic contents coagulating into a "Self." Transcendentalism fails here because its Ego is merely a universal function which does not cohere with its apperceived contents. T. R. GARTH (Texas)

547. HUNTER, W. S., An Open Letter to the Anti-Behaviorists. *J. of Philos.*, 1922, **19**, 307–308.

It is possible that some small amount of self-analysis, some careful introspection, may throw light on the "Behavioristic Controversy." If asked "Who are the Behaviorists?" a bibliography of

the past decade will bring out the fact that there are only two, *i.e.*, Drs. John B. Watson and A. P. Weiss, whose labors are summed up in two books and "some" dozen papers. The writer cannot admit there is any other behaviorism than that advocated by Dr. Watson, a system that takes as its subject-matter not consciousness, but stimulus and response relationships. Some of you have advocated other systems but you do not succeed. You are unnecessarily uneasy for fear that behaviorism is spreading if we may take the literature to witness the facts. It cannot be possible that your articles are for the purpose of "intellectual exercise" merely, nor to display critical skill; it is in fact the power and incisiveness of the theory itself which you fear and which causes you to see in all those not "anointed introspectionists," enemies. You detect danger in all objective study. One might be persuaded to believe that "Watson has found the Achilles heel of your 'old' psychology." Subscribed, "affectionately yours."

T. R. GARTH (Texas)

548. FERREE, C. E., AND RAND, G., A New Laboratory and Clinic Perimeter. *J. of Exper. Psychol.*, 1922, **5**, 46–67.

The authors have described in this article the means by which such factors in perimetric determinations as the intensity of the stimulus, the brightness of the preëxposure and the surrounding fields, the intensity of the general illumination, and the accuracy and steadiness of fixation are controlled.

The device finally adopted for the control of intensity of stimulus consists essentially of an 180° and a 90° arc of like radii of curvature joined together at the center rotation at right angles to each other. At the end of the 90° arc is placed a type C Mazda lamp housed by a box of black japanned iron with an aperture cut in it so that the light radiates freely without shadows and with equal intensity to every point on the arm of the perimeter. The brightness of the surrounding field of the stimulus is controlled by pasting the Hering pigment papers used onto grey cards the tints of which are equated to the brightness of the colors. The control of the preexposure field is provided for by the use of grey cards of various brightnesses which cover the stimulus card until the observer has taken his fixation. There are two devices which aid in securing accuracy and steadiness of fixation. One consists of a small circular mirror as a fixation object in which *O* sees the image of his own eye. From the position of the image of his pupil and iris as seen in

the mirror *O* can determine the correct place of fixation. The second device is similar in principle to a peep-sight. A small black disc at the center of rotation of the perimeter is so situated with respect to a circular aperture nearer the eye of the observer that when the eye has the proper position and fixation, the edge of the opening is seen concentric to the disc with a narrow ring of the grey arm of the perimeter showing between. A head rest which follows approximately the outlines of the forehead, side of the head, and face, furnished with an adjustable chin rest, aids in maintaining correct fixation. The authors describe further certain additional controls which make for finer technique in special clinical perimetric determinations.

C. C. Pratt (Harvard)

549. Toops, H. A., Solving Intercorrelations by Polar Coördinates. *J. of Exper. Psychol.*, 1922, **5**, 68–75.

The author continues in this his discussion and description of methods for reducing the amount of time and labor required in solving correlations.

C. C. Pratt (Harvard)

550. Miles, W. R., Note on Electric Counters. *J. of Exper. Psychol.*, 1922, **5**, 76–78.

A very serviceable automatic counter for use in various laboratory experiments is the "p.b.x. message register" manufactured by the Western Electric Company of Boston. It is possible with this apparatus to register 500 contacts per minute for short periods of operation.

C. C. Pratt (Harvard)

551. Lovejoy, A. O., The Length of Human Infancy in Eighteenth Century Thought. *J. of Philos.*, 1922, **19**, 381–385.

There is nothing surprising about the single instance of anticipation of John Fiske's theory as to the meaning of infancy cited in the anonymous writings in the Friends Annual by Prof. W. R. Wells in a recent issue of the *J. of Philos.*, 1922, **19**, 208. Observations as to the longer infancy of man as compared to that of other animals have been expressed in both poetry and treatise by writers of the eighteenth century. We find it in Pope's "*Essay on Man*" (1733) and "*Fragments or Minutes of Essays*" by Bolingbroke who was a contemporary of the poet and appears to have provided him with some of his material. As well does Locke, who a half century before called

attention in his "*Second Treatise of Government*" to the same fact. In fact Rousseau took Locke to task for his explanation of the facts, and likewise does the writer of the article here abstracted. So then Fiske's theory as to the origin of the family was not new and it was not true.

T. R. GARTH (Texas)

2. NERVOUS SYSTEM

552. STERNSCHEIN, E., Experimentelle Untersuchungen über die Beziehungen swischen Halssympathicus und Pupille. *Arch. f. d. ges. Physiol.*, 1922, **193**, 281–295.

Das Ganglion cervicale supr. vermittelt erstens den vom Zentralnervensystem ausgehenden Dilatatortonus, zweitens vermindert es die Erregbarkeit des Dilatators für hämatogene Reize (Adrenalin u. s. w.). Die letztere Funktion kann vom Zentralorgan wiederum gehemmt werden.

STEINHAUSEN (Frankfurt a/M.)

553. LASAREFF, P., Untersuchungen über die Ionentheorie der Reizung. 2. Mitteilung. Die Ionentheorie der Reizung und die Pflügerschen Gesetze. *Arch. f. d. ges. Physiol.*, 1922, **193**, 231–235.

Unter der Annahme, dass die K-Ionen das lebende Gewebe reizen, die Ca(oder Mg-)Ionen die Erregung hemmen, und dass im übrigen die Erregbarkeit nur vom Verhältnis der Konzentrationen dieser beiden Ionen abhängig ist (je grösser dieses Verhältnis, um so grösser die Erregbarkeit), berechnet Lasareff dieses Verhältnis in einer Fibrille bei Stromdurchgang. Er findet, dass dieses Verhältnis und damit die Erregbarkeit bei Stromdurchgang in der Mitte zwischen Kathode und Anode unverändert bleibt und nach der Kathode (wegen der grösseren Wanderungsgeschwindigkeit der K-Ionen) zunimmt und nach der Anode abnimmt. Nach der Stromöffnung kehrt sich das Verhältnis um.

STEINHAUSEN (Frankfurt a/M.)

554. LASAREFF, P., Untersuchungen über die Ionentheorie der Reizung. Ionentheorie der Reizung des Gehörorgans. *Arch. f. d. ges. Physiol.*, 1922, **193**, 1–6.

Lasareff nimmt an, dass zwischen den Schwingungsvorgang der Cortischen Fasern und der Erregung des Akustikus ein chemischer

Prozess eingeschaltet ist, bei dem Ionen ausgeschieden werden. Die Empfindlichkeit des Ohres wird als abhängig von dem Verhältnis der Konzentration dieser Ionen zu der anderer erregungshemmender Ionen angesehen. Unter Zugrundelegung der Konstanz des Konzentrationsverhältnisses für Minimalreize (Loeb'sches Gesetz) wird dann die Adaptationskurve (Veränderung der Konzentrationen und Empfindlichkeit unter Schalleinwirkung) des Ohres berechnet und mit einer experimentell gefundenen Kurve verglichen, wobei Übereinstimmung beider Kurven festgestellt wird.

STEINHAUSEN (Frankfurt a/M.)

555. BECHER, E., W. Köhlers physikalische Theorie der Physiologischen Vorgänge, die der Gestaltwahrnehmung zugrunde liegen. *Zeits. f. Psychol.*, 1921, **87**, 1–44.

B. gibt eine Einführung in die Theorien, die W. Köhler in seinem Buche "Die physischen Gestalten . . ." (1920) entwickelt hat, und verbindet damit weiterführende Betrachtungen und immanente Kritik. Psychische Gestalten sind nicht blosse Summen, sondern Einheiten, deren charakteristische Eigenschaften aus Eigenschaften ihrer Teile nicht zusammensetzbar sind. Zur Förderung des Gestaltproblems will nun Köhler nach einheitlichen Gestalten in der physischen Welt suchen. Die zentralnervösen Processe, die psychischen Gestalten Korrespondieren, müssen, so postuliert K. ebenfalls einheitliche, *gestaltete* Gesamtvorgänge sein. Die Analyse solcher physischer Gestalten führt zu exakt erfassbaren physikalischen Gestalten. Eine solche stellt z. B. die Verteilung der Elektrizitätsbewegung in einem vom Strom durchflossenen leitenden Körper dar. Die Kenntnis physikalischer Gestalten will dann K. auswerten für ein tieferes, physikalisches Verständnis der zentral-nervösen gestalten Prozesse und damit für die Theorie der psychischen Gestalten. B. arbeitet an der Abgrenzung des Gestaltbegriffes sowie an der Einteilung der Gestalten und weist ferner auf Untersuchungen von S. Becher über Gestaltbildung an Skeletteilen hin (*Zoolog. Jahrb.*, 1912, **31**, 1–188), die merkwürdige Analogien, zum Problem der Gestaltwahrnemung bieten.

E. BECHER (München)

556. LOEVI, O., Ueber humorale Uebertragbarkeit der Herznervenwirkung. II. Mitteilung. *Arch. f. d. ges. Physiol.*, 1921, **193**, 201–213.

Der bei Vagusreizung in das Herz ausgeschiedene, Herzstillstand erzeugende Stoff wird bei anders erzeugter Herzruhe *nicht* ge-

bildet; er muss also mit der Vagusreizung ausammenhängen. Zwar wird mehr Cholin in der Herzflüssigkeit bei Vagusreizung gefunden als sonst; trotzdem handelt es sich nicht bei der Vagussubstanz um Cholin. Atropin hebt die Wirkung der Vagussubstanz auf, die also wahrscheinlich jenseits der Nervenendigungen angreift. Auch die Natur der Acceleranzsubstanz konnte bisher nicht aufgeklärt werden.

BETHE (Frankfurt a/M.)

557. BECK, O., Die gesammte Kraftkurve des tetanischerten Froschgastrocnemius und ihr physiologisch ausgenutzter Anteil. *Arch. f. d. ges. Physiol.*, 1922, **193**, 495–526.

Beim durchbluteten, wie beim ausgeschnittenen Muskel nimmt die *Gesamtspannung* im isometrischen Tetanus mit der Zunahme der Anfangslänge zuerst stark zu, erreicht bei mässiger Anfangsspannung ein Maximum, sinkt bei weiterer Vermehrung der Anfangsspannung wieder ab und steigt später bis zum Zerreisen des Muskels wieder an. Der Spannungs*zuwachs* wächst aber nur bis zum Maximum der Gesamtspannung und wird bei weiterer Dehnung geringer. Der Bestimmung der absoluten Muskelkraft ist der Spannungs*zwachs* au Grunde zu legen. Von der ganzen Kraftkurve wird physiologisch nur ein kleiner Teil ausgenutzt. Das Maximum der physiologisch ausgenutzten Kraftkurve fällt mit dem Maximum des Spannungszuwachses zusammen.

BETHE (Frankfurt a/M.)

558. GROEBBELS, F., Der allgemeine Aufbau des Ernährungssystems der nervösen Zentralorgane im Lichte der Chloridmethode. *Arch. f. d. ges. Physiol.*, 1921, **193**, 128–170.

Frisch mit Silbernitrat behandelte und später im Licht reducierte Blöcke vom Zentralnervensystem lassen an bestimmten Stellen braune und schwarze, körnige Niederschläge erkennen, welche als die Hauptorte des Vorhandenseins von Chloriden resp. Phosphaten wahrend des Lebens angesehen werden. Die dargestellten Strukturen sind a. T. mit bekannten Strukturen identisch (pericelluläre Netze, Glianetze, etc.). Sie werden gedanklich zusammengefügt zu einem besonderen Ernahrungssystem, das an arteriellen Capillaren beginnt, Zellen und Dentriten umfasst und an venösen Gefässen in die Blutbahn mündet. Die Einzelheiten sind ohne die Abbildungen nicht verständlich.

BETHE (Frankfurt a/M.)

559. Spiegel, E. A., Untersuchungen über den Muskeltonus. 1: Mitteilung. Der Weg der tonischen Innervation vom Zentralnervensystem zum Muskel. *Arch. f. d. ges. Physiol.*, 1921, **193**, 7–15.

Die Untersuchung richtet sich gegen die Annahme von E. Frank, dass die tonische Innervation der Skelettmuskeln ihren Weg durch die hinteren Wurzeln nehmen soll. Untersucht wurde der Labyrinthtonus. Fröschen wurden auf beiden Seiten die hinteren Wurzeln für die Hinterbeine durchschnitten und das rechte Labyrinth herausgenommen. Wenngleich nach Durchschneidung der hinteren Wurzeln allein schon deutliche Aenderungen in der Haltung der Hinterbeine auftreten, so trat doch bei der combinierten Operation eine stets eindeutige Asymmetrie in der Haltung der Extremitäten zu Tage (stärkere Abduktion der Beine der gekreuzten Seite). Daraus wird geschlossen, dass hinteren Wurzeln nicht der Weg der tonischen Innervation sind, sondern die vorderen.

Bethe (Frankfurt a/M.)

560. Cohn, A. W., Hugo Riemann als Systematiker der Musikwissenschaft. *Zeits. f. Musikwiss.*, 1920/21, **3**, 46–50.

Als der fundamentale Mangel des Riemannschen Systems wird seine psychologistische, logizistische, schlieslich ökonomische Haltung gegenüber den musikphilosophischen Grundfragen hingestellt. Riemanns "Ideen von der Lehre der Tonvorstellungen" (*Jahrb. d. Bibliothek Peters.* Leipzig 1914/15) erfahren eine kritische Behandlung. Nach der Meinung des Verfassers mus die musikalische Psychologie gegenüber der Tonpsychologie ihre Selbständigkeit behaupten; auserdem ist eine reinliche Scheidung von der Musikästhetik unumgänglich.

R. Wicke (Leipzig)

561. Lewy, H., Ueber das Gähnen. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **72**, 161.

Der erste und ursprüngliche Zweck des Gähnens ist vermutlich rein körperlicher Art: Erhöhung des Tonus der dabei beteiligten Muskulatur (Parallelerscheinung: das Sich-strecken). Es dient aber auch als Ausdrucksautomatismus für Langeweile; diese Bedeutung hat es vielleicht auf dem Wege der gewohnheitsmässigen Assoziation (Darwin) erlangt.

Haymann (Freiburg)

562. SCHILDER, P., Zur Kenntnis der Zwangsantriebe. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **65**, 368.

Die Triebkraft eines aus irgend welchen Gründen nicht in die Tat umgesetzten Impulses (oder Wunsches) gibt den Gedanken Zwangscharakter.

HAYMANN (Freiburg)

3. SENSATION AND PERCEPTION

563. HELLER, H., Ueber die Geruchstheorie von Teudt II. *Biol. Centralbl.*, 1921, **41**, 138–142.

Weiterführung einer Polemik, vergl. *Biol. Centralbl.* 1919, **39**, 364.

ZUR STRASSEN (Frankfurt a/M.)

564. ENGELKING, E., Ueber die Bedeutung kortikaler Erregungen für die Form und das Auftreten des einseitigen vertikalen und latenten Nystagmus. *Klin. Monatsbl. f. Augenheilk.*, **68**, 50.

E. empfiehlt graphische Darstellung der Augenbewegung (Nystagmus) durch aufgesetzten Hebel unter Berücksichtigung der Fixationsebene des Auges. Mit dieser Versuchsanordnung wird ein Fall von einseitigem Vertikal-Nystagmus (Pendelnystagmus) eingehend wiedergegeben und gezeigt, dass das Auge nicht um die Fixationsebene pendelt, sondern dass es rhytmisch in diese zurückkehrt, damit besteht enge Verwandschaft mit den einseitigen Ver tikalbewegungen Bielschowskys, Ebenso tritt auf den Kurven der nystagmushemmende Einfluss des Fixationsimpulses hübsch hervor. Auch an ? Falle von latentem Nystagmus zeigt E., dass latente Deviation weiter nichts ist, als die langsame Phase des Nystagmus (eine Verwandschaft, die ja auch bei anderen Nystagmusarten hervortritt, Ref.). Die Arbeit Bildet einen wichtigen Beitrag für die so interessante Frage des gesetzmässigen Einflusses der Gesichtswahrnehmungen auf die Augenbewegungen.

KOELLNER (Würzburg)

565. LAIRD, D. A., Why the Movies Move. *Sci. Mon.*, 1922, **14**, 364–378.

The apparent continuity of pictures when the screen is actually in darkness 16 times per second is explained, first, in terms of retinal inertia sufficient to cover the dark period of changing the

picture, second in terms of the overcoming of the flicker phenomenon by the use of the extra blade that serve to multiply the number of interruptions. The illusion of motion is probably a result of the filling-in by the mind's expectation, imagery, etc. The perception of depth in the picture is due to various factors—well known to psychologists.

J. F. DASHIELL (North Carolina)

566. BUKOFZER, M., Das Indeomotorische in unsorem Stimmorgan und in der Musik. *Beitr. z. Anat., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.*, 1921, **17**, 191–222.

In einer früheren Abhandlung (Vom Erleben des Gesangstones. Diese Beiträge Bd. XV, 1920) hat der Verfasser zu zeigen versucht, das die ideomotorische Bewegung, die endotaktile Gehörsinterpretation durch das Stimmorgan, nicht auserhalb der Gemütsbewegungen verläuft, sondern ihr selbst angehört; ein gewöhnlich als rein geistig aufgefaster Vorgang wird von ihm als ein seelisch-körperlicher Complex erkannt. Weiterhin sucht nun d. V. die Beziehungen solcher psychophysiologischer Vorgänge zum künstlerischen Schaffen, ästhetischen Verhalten und Geniesen aufzuweisen. Es erfolgt eine scharfe Scheidung zwischen realen Gefühlen, wie sie in der Lautgebärde zum Ausdrucke kommen, und den ästhetischen Gefühlen, die aber auch als durchaus echte Gefühle, wenn auch als von einer besonderen Art, bezeichnet werden. Beide haben als gemeinsamen Mutterboden die inneren Beziehungen zwischen musikalischer Klangbewegung und Gemütsbewegung. Längere ästhetische und in philosophischer Hinsicht vitalistisch gefärbte Auseinandersetzungen bringen ihn zur Aufstellung einer "kosmischen Formel" als eines Prinzipes alles normalen und idealen Weltgeschehens und eines Prinzipes der Wahrheit und Schönheit.

R. WICKE (Leipzig)

567. STUMPF, C., Veränderungen des Sprachverständnisses bei abwärts fortschreitender Vernichtung der Gehörsempfidungen. *Beitr. z. Anat., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.*, 1921, **17**, 182–190.

Die Ergebnisse seiner Untersuchungen zur Analyse der Konsonanten verwendet der Verfasser um nach der Interferenzmethode ein Bild der Zerstörung des Gehörs in bestimmten pathologischen Fällen zu gewinnen; er gibt Tabellen die die Veränderungen ablesen lassen,

denen Vocale und Konsonanten ausgesetzt sind, wenn ein von oben nach unten fortschreitender Verlust des Gehörs eintritt. Als entscheidende Gegend stellt er die A-Formanten (e–c) fest. Er vergleight seine Ergebnisse mit denen der neusten Untersuchungen über die Frequenz der Fernsprechströme. Als notwendige Grenzen für das Telephon werden 500–2100 Schwingungen verlangt, und als ausschlaggebend haben sich 800 Schwingungen bewährt; das entspricht dem nach der Interferenzmethode gefundenen Formantzentrum des A, der Mitte der " Sprachsexte."

R. Wicke (Leipzig)

568. Stumpf, C. Zur Analyse der Konsonanten. *Beitr. z. Anat. Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses.*, 1921, **17**, 15–181.

Im Anschlus an frühere Untersuchungen (Zur Analyse geflusterter Vocale. *Diese Beiträge,* 1919, **19**) hat der Verfasser Formantregionen und Gesamttonumfang geflüsterter Konsonanten (Sch, S, F, Ch palatale und gutturale, K, P, R linguale, M, N, Ng, L, H nach deutscher Aussprache) durch systematische Interferenzversuche festgestellt. In der Hauptsache beschränkt er sich auf eine beschreibende Darstellung der Lautphänomene; nur gelegentlich werden die Ergebnisse von W. Köhler, Gutzmann, Hermann, Helmholtzu. a. zu kritischem Vergleich herbeigezogen. Den Abschlus bildet eine zusammenfassende graphische Uebersicht des Aufbaues stimmloser Vocale und Konsonanten.

R. Wicke (Leipzig)

569. Stumpf, C., u. Allesch, G. J., Ueber den Einflus der Röhrenweite auf die Auslöschung hoher Töne durch Interferenzröhren. *Beitr. z. Anat., Pathol. u. Therapie d. Ohres, d. Nase u. d. Halses,* 1921, **17**, 143–150.

Die Verfasser stellten fest, das die einzustellenden Röhrenlängen von den berechneten abweichen, und zwar um so mehr, je gröser das Lumen der Röhre ist und je mehr die Tonhöhe wächst. Eine Erklärung dieser Erscheinung wird von den Verf. nur angedeutet, im übrigen weisen sie darauf hin, das der Interferenzvorgang verwickelten Bedingungen unterliegt, deren Aufklärung den Physikern überlassen werden mus.

R. Wicke (Leipzig)

570. Carrière, P., Tonaler Organismus und Tonsystem. *Musikpädagogische Blätter,* 1921, Nr. 21/22 u. 23/24.

Die Beweisführung für den an sich berechtigten Satz, das die tonale Idee nicht in objektiven physischen Tatbeständen, sondern in der menschlichen Psyche begründet sei, vermag nicht in allen Teilen zu überzeugen.

R. Wicke (Leipzig)

571. Blessinger, K., Zur Psychologie des musikalischen Schaffens. *Neue Musikzeitung,* 1920, **41**, 373 f.

Der Verfasser beschränkt sich bei der Darlegung des künstlerischen Gestaltungsprozesses auf die Verwendung der allgemeinen Begriffe des Unbewusten und der bewusten Gehirnfunktionen, die er der Intuition und der Reflexion gleichsetzt. Das naive, intuitive Schaffen ist ein Kennzeichen jugendlicher Geistesverfassung, das reflektierende Schaffen ein solches des reiferen Alters, und zwar sowohl in bezug auf individuelle, wie auf generelle Entwicklungsstufen.

R. Wicke (Leipzig)

572. Fischer, S., Kritische Musterung der neueren Theorien über den Unterschied von Empfindung und Vorstellung. *Zeits. f. d. ges. Neurol. u. Psychiat.,* 1921, **64**, 260.

Die Frage nach dem Unterschied zwischen Empfindung und Vorstellung wird vor allem durch die Grenzfälle und durch pathologische Erscheinungen geweckt (Wachträume, Traumbilder, Pseudohalluzinationen und Halluzinationen). Das Kriterium ist nicht, wie populär angenommen wird, das Vorhandensein oder das Fehlen eines äusseren Reizes, sondern das Ueberzeugtsein von dem Vorhandensein eines solchen, wobei es gleichgültig ist, ob dies Ueberzeugtsein der Wirklichkeit entspricht oder nicht. Es handelt sich dabei nicht um ein aktuelles, sondern um ein dispositionelles Wissen. Gibt es Merkmale der Erscheinungen (des Inhalts oder der Form), die eine Unterscheidung der Empfindungen von den Vorstellungen bzgl. ihres Verhältnisses zu äusseren Reizen gestatten? Die Intensität ist als Kriterium ungeeignet. Von andern Merkmalen sind die altgebräuchlichen (Körperlosigkeit und Blässe, Armut und Lückenhaftigkeit, Unbeständigkeit und Flüchtigkeit) als unzulänglich erwiesen. Blickpunkt und Blickfeld als Merkmale von Vorstellung bezw. Empfindung unterliegen dem gleichen Kriterien, ähnlich das "Gefühl der

Aktivität," das "von der Willkür Unabhängigsein," die "Verschiedenheit des Raums," "Selbstgegenwart," "Eigenpräsenz," "Leibhaftigkeit," die alle von verschiedenen Autoren als Kriterien angeführt worden sind. Den Ausweg sieht der Verfasser in dem genetischen Lösungsversuch von *Lindworsky;* aber auch die danach geltenden Kriterien (Kontrolle durch andere Sinnesgebiete und Möglichkeit der Einordnung in den Zusammenhang) versagen unter Umständen, und dann ist eine Unterscheidung zwischen beiden Erlebussen nicht möglich.

HAYMANN (Freiburg)

573. MÜLLER, E., Die monokulare und binokulare Reizschwelle der dunkeladaptierten Augen. *Arch. f. d. ges. Physiol.,* 1922, **193**, 29–38.

M. prüfte die Angaben Pipers (die Reizschwelle des dunkeladaptierten Auges bei binokularem Sehen kann bis auf die Hälfte der monokularen Schwelle sinken) und Wölfflins, der diese Angaben nicht bestätigen konnte. M. arbeitete mit einer neuen Versuchsanordnung. Die Lichtintensitätsabstufung geschah durch eine besonders hierfür hergestellte Apparatur (Zeiss, Jena.). Seine Resultate, die "die Frage nicht abschliessend lösen," ergaben keine Anhaltspunkte für die Annahme, dass im dunkeladaptierten Auge die binokulare Schwelle tiefer liege als die monokulare. Bemerkenswert ist, dass die Grenzen für Erscheinen und Verschwinden des Lichteindruckes sich näherten, wenn die Versuchspersonen mit der Hand nach dem Licht tasteten und "dadurch die Blickrichtung mittels des Tasteindruckes dirigierten."

HAPPEL (Frankfurt a/M.)

574. ALLERS, R. u. HALPERN, F., Wechselwirkungen gleichzeitiger Erregung mehrerer Hautsinne. I. Mitteilung. Die Beeinflussung der Tastschwelle durch die Hauttemperatur. *Arch. f. d. ges. Physiol.,* 1922, **193**, 595–609.

Die Druckschwellenkurve bei erwärmter Haut geht bei 36–38° durch ein Minimum. Dieselbe Kurve resultiert bei passiver Spannung der Haut. Congestions- und Stauungshyperaemie vermindern die Druckschwelle. Verminderung tritt ebenso ein bei Hautentspannung, wenn die Spanning hochgradig war. Dagegen steigt die Druckschwellenkurve an bei Hautentspannung, wenn die Spannung normal oder wenig übernormal war. Oedeme und Ascites bedingen

Erhöhung oder Verminderung je nach Grösse der durch sie verursachten Spannungen. " Für die Deutung des Verhaltens der Schwelle kommt vor allem der Momenz der Spannung in Betracht. Inwieweit die rein physikalischen Veränderungen: Verdünnung der Haut und Veränderung der Deformabilität, inwieweit die simultane Sinneserregung den Ausschlag geben, bedarf weiterer Aufklärung.

HAPPEL (Frankfurt a/M.)

575. CASPRY, H. u. GOERITZ, K., Die Synergie von Akkommodation und Pupillenreaktion. *Arch. f. d. ges. Physiol.*, 1922, **193**, 225–230.

Verfasser suchten einen objektiven Beweis zu erbringen für den Nachweis von O. Weiss und E. Wlotzka, " das die Pupillenveränderung bei der Einstellung des Auges für die Nähe nur dem Konregenzvorgang und nicht der Akkommodation untergeordnet ist." Die Versuchsanordnung glich im wesentlichen der von Weiss und Wlotzka. Die Pupillenweite wurde ohne besondere Hilfsmittel beobachtet. Die akkommodativen Veränderungen der Linse bei Nah-und Ferneinstellung wurden aus den Entfernungsänderungen zweier Spiegelbilder auf der Linse berechnet. (Genaueres s. die Arbeit). Das Untersuchungserbebnis fassen die Verfasser Dahin zusammen, dass bei der Synergie der Konvergenz, Akkommodation und Pupillenverengerung die " Akkommodation und Pupillenverengerung dem Konvergenzakt untergeordnet, voneinander aber unabhängig sind."

HAPPEL (Frankfurt a/M.)

576. HORNBOSTEL, E. M. VON, Formanalysen an siamesischen Orchesterstücken. *Arch. f. Musikwiss.*, 1920, **2**, 306–333.

Die Arbeit bringt einen Nachtrag zu Stumpfs Abhandlungen über Tonsystem und Musik der Siamesen (*Beitr. z. Akustik. u. Musik.* 3. Heft.) Dem in Photographie und Notenschrift gebotenen Materiale werden Formanalysen angeschlossen, in denen u. a. auf das Januspringzip, die Doppelfunktion von Tönen, Takten oder Gruppen als Abschlus und zugleich als Anfang, näher eingegangen wird.

R. WICKE (Leipzig)

577. ROELOFS, C. O. UND BIERENS DE HAAN, L., Über den Einfluss von Beleuchtung und Kontrast auf die Sehschärfe. *Arch. f. Ophthal.*, 1922, **107**, 151–189.

Die sorgfältigen Untersuchungen ergaben im wesentlichen folgende Beziehungen: Betrachtet man die kleinste wahrnehmbare

Oberfläche, den Empfindungskreis, die kleinste Empfindungsbreite und den kleinsten wahrnehmbaren Richtungsunterschied als die Faktoren, aus welchen sich die Sehschärfe zusammensetzt, dann verhalten sich alle diese Faktoren umgekehrt proportional der Wurzel aus der Beleuchtung. Hieraus folgt, das die Sehschärfe selbst direkt proportional der Wurzel aus der Beleuchtung ist. Das gleiche scheint auch für die Kontraste zu gelten: die Sehschärfe ist direkt proportional der Wurzel aus dem Unterschiede der Lichtstärke von Gegenstand und Grund.

KÖLLNER (Würzburg)

578. DE KLEYN, A. UND STORM VAN LEEUWEN, W., Ueber vestibuläre Augenreflexe. III. *Arch. f. Ophthal.*, 1922, **107**, 109–122.

Die Theorie von Barany über die Entstehung des Kaltwassernystagmus wird durch experimentelle Befunde beim Kaninchen bestätigt. Beider Enstehung des Nystagmus spielt die Abkühlung der horizontalen Bogengänge die entscheidende Rolle, in dem meisten Fällen beteiligen sich dabei aber auch die vertikalen Bogengänge. Bei der Untersuchung des Kaltwassernystagmus in verschiedenen Stellungen des Kopfes im Raum müssen auch die kompensatorischen Augenstellungen mitberücksichtigt werden.

KÖLLNER (Würzburg)

579. KOELLNER, H. UND HOFFMANN, P., Der Einfluss des Vestibularapparates auf die Innervation der Augenmuskeln. *Arch. f. Augenheilk.*, 1922, **90**, 170–194.

Die sorgfältige Untersuchung der Aktionsströme der Augenmuskeln und ihrer Beeinflussung durch die Innervation vom Vestibularapparat aus (Drehnystagmus, Nachnystagmus, Zerstörung eines Labyrinths) ergaben beim Kaninchen übereinstimmend, dass dadurch lediglich die Stromschwankungen des Ruhetetanus verstärkt bezw. abgeschwächt werden, dass jedoch ein besonderer vestibulärer Innervationsrythmus nicht stattfindet. Es liess sich auch keine Stütze dafür erbringen, dass der quergestreiften Muskulatur ausser der gewöhnlichen tetanischen Tätigkeitsform noch eine andere der glatten Muskulatur entsprechende zukommt. Schliesslich ergaben die experimentellen Untersuchungen (Ausschaltung beider Labyrinthe) sowie theoretische Ueberlegungen, dass den Muskeln im Ruhezustande eine nennenswerte Verstärkung ihres Tonus durch das Labyrinth nicht zukommt. KÖLLNER (Würzburg)

580. Byrne, J., The Present Status of Epicritic and Protopathic Sensibility and a Method for the Study of Protopathic Dissociation. *J. Nerv. and Ment. Dis.*, 1922, **55**, 1–12.

The subdivision of cutaneous sensibility into epicritic, protopathic, and deep was one of the results of experiments described by Head: but other experimenters, notably Boring, and Trotter and Davies, have contested the validity of this subdivision. The present author, on the basis of work done on syringomyelia and other conditions, supports Head's conclusion as to a genuine dissociation between epicritic sensibility (which includes the "critical or quantitative elements—sharpness, size, shape, warmth," etc.) and protopathic sensibility (which includes the affective or "hurt" elements). Moreover, the nervous pathways for the two systems are distinct throughout. But Head's terminology is stated to be misleading, and some of his data improperly analyzed; the present author proposes the following classification in place of Head's: there are four kinds of cutaneous sensibility, (1) superficial critical, (2) superficial affective, (3) deep critical, (4) deep affective. Neurological procedure can be made very much more helpful and significant if a method be adopted by which a comparison is made between a normal area and an affected area, by the introspective study of the reactions to various types of stimuli; for example, in a study of protopathic dissociation for a stimulus heated to .55 C. The following types of reaction may be noted: touch, heat, (warmth), subjective overreaction (hurt, etc.), objective overreaction (withdrawal), localization, radiation, reference, persistence, ability to name stimulus. In each case one compares the affected area with a corresponding normal area by use of a zero for absence of the given reaction, and a varying number of plus signs (1, 2, or 3) for presence in varying intensity or quantity. In all this however, the author does not lose sight of a fundamental distinction in nerve-endings into the four types named, the functioning of which is the chief object of study.

G. Murphy (Boston Psychopathic Hospital)

581. Adams, E. Q. and Cobb, P. W., The Effect on Foveal Vision of Bright (and Dark) Surroundings. V. *J. of Exper. Psychol.*, 1922, **5**, 39–45.

On the basis of certain assumptions derived from the all-or-none hypothesis regarding the nature of the nerve processes of the retina, the authors have formulated quantitative expressions for the effect

of bright and dark surroundings on the difference-threshold of foveal vision. Comparison of the values calculated from these formulae with the limens for brightness obtained in actual experiment reveals a substantial agreement between the two sets of data. The range of application of the formulae to various conditions in visual experimentation remains still to be determined.

C. C. PRATT (Harvard)

5. MOTOR PHENOMENA AND ACTION

582. GERSTMANN, J. UND SCHILDER, P., Studien über Bewegungsstörungen. I. Eigenartige Formen extrapyramidaler Motilitätsstörung. *Zeits. f. d. ges. Neurol. u. Psych.*, 1920, **58**, 266–275.

Analysierung eines eigenartigen Falles einer 31 jährigen Kranken mit Rigor, Bewegungsverarmung, Retropulsion, Adiodochokinese und paralysis-agitans-ähnlichem Zittern. Wiederholte passive Bewegungen verstärkten den Rigor bis zur Unüberwindbarkeit. Keine Neigung, passiv gegebene Stellungen zu fixieren. Die aktive Bewegung wirkt sofort entspannend. Der zweite Fall betrifft eine Paralysis agitans-artige Beobachtung mit Katalepsie und Spannung im rechten Arm. Der Rigor betrifft am Arm Agonisten und Antagonisten gleichmässig. Akinese und Hypertonus finden sich auch an den übrigen Gliedmassen. Im Anschluss daran Erörterungen Lokalisatorischer Art und über den Einfluss von Abänderungen zerebraler Funktionsmechanismen auf psychischem Wege.

G. STEINER (Heidelberg)

583. GERSTMANN, J. UND SCHILDER, P., Studien über Bewegungsstörungen. II. Ein eigenartiger Typus motorischer Reizerscheinungen. *Zeits. f. d. ges. Neurol. u. Psychol.*, 1920, **58**, 276-279.

Fall von Encephalitis epidemica mit eigenartigen unwillkürlichen rhythmisch aufeinanderfolgenden, gleichmässigen Spontanbewegungen von koordiniertem Charakter in Form von Greif-, Scharr-, Kratz- und Fangbewegungen, und abwechselnden rhythmischen Beuge- und Streckbewegungen im Knie-, Hüft- und Fussgelenk bzw. rhythmischen Rotationsbewegungen im Hüft- und Fussgelenk. Alles nur rechtseitig. Hervorhebung der Aehnlichkeit mit katatonen und hysterischen Stereotypien. Keine Ermügserscheinungen hiebei.

G. STEINER (Heidelberg)

584. Gerstmann, J. und Schilder, P., Zur Kenntnis der Bewegungsstörungen der Pseudosklerose. *Zeits. f. d. ges. Neurol. u. Psychol.*, 1920, **58**, 33–57.

Die Verfasser analysieren die Bewegungsstörung bei einem Fall von Pseudosklerose mit einem den ganzen Körper betreffenden Rigor und einem groben Wackeln bei Intentionne. Die Spannungen sind im Gesicht, an den oberen und unteren Gliedmassen und rechts und links verschieden ausgesprochen. Die Weckung des Hypertonus geschieht durch aktive Bewegungen, durch brüske oder langsame passive Bewegungen, durch Haut reize und durch psychische Erregung. Der Hypertonus setzt jäh und plotzlich ein, wobei er dann die aktiv gewonnene Stellung fixiert. Passiv gegebene Stellungen werden nicht beibehalten. Ist Spannung vorhanden, so wird einige Zeit zu de für die aktive Bewegung nötige Entspannung gebraucht. Abwehr- und halb unwillkürliche Greifbewegungen gelingen besser als aufgetragene. Das Wackeln besteht in einem Hin- und Herpendeln in der Richtung der geforderten Intention und verstärkt sich gegen das Ende derselben. Tremor und Hypertonus zeigen die Neigung zur Ausstrahlung in andere Muskelgebiete mit einer regellosen und sehr ausgedehnten Ausbreitung; besonders auch beim Versuch des Aufrichtens und Gehens. Ausgesprochene Verarmung an spontanen Bewegungsantrieben. Eher lebhafterer Rückstoss als in der Norm. G. Steiner (Heidelberg)

585. Winter, W. und Götz, W., Beobachtungen über den Kisch'schen Reflex bei Schädelverletzungen. *Zeits. f. d. ges. Neurol. u. Psychol.*, 1920, **58**, 280–295.

Etwa in einem Drittel der Fälle von Schädelverletzungen fand sich ein normaler Kisch'scher Reflex. In dem anderen zwei Dritteln pathologische Reflexveränderung. Mehrfach hintereinander festgestelltes Fehlen des Reflexes spricht für organische Schädelverletzung, wenn Ohren und peripheres Nervensystem intakt und zentrale organische Nervenleiden (multiple Sklerose, Paralyse) auszuschliessen sind. Fehlen de Reflexes spricht für organische Schädelverletzung; Ueberdauern des Reflexes für stark nervöse, psychogene und hysterische Erscheinungen. Bei häufig wiederholter Reflexprüfung lässt der Reflex in seiner Intensität nach. Eine lebhafte Tränensekretion trat bei der Reflexprüfung nur selten hervor; ebenfalls selten fand sich bei fehlendem Reflex die geringe Pupillenerweiterung oder eine Lidspaltenerweiterung mit Vortreten der Augäpfel. G. Steiner (Heidelberg)

586. Lewy, F. H., Die Grundlagen des Koordinationsmechanismus einflacher Willkürbewegungen. *Zeits. f. d. ges. Neurol. u. Psychol.*, 1920, **58**, 310.

Verfasser geht von der Tatsache des Rückstosses aus und davon, das bei Amputierten mit Sauerbruchschem Wulst bei der Einzelreaktion der Rückstoss fehlt, während in der fortlaufenden Kurve die Bewegung der normalen gleicht, was damit erklärt wird, dass die Amputierten durch die Uebungen einen vom normalen abweichenden Bewegungsmechanismus künstlich erlernen, dass es aber durch erneute Uebung gelingden alten Mechanismus in kurzer Zeit wieder hervorzurufen. Durch Betrachtung der Muskelkurven belasteter Beuger odet Strecker konnte gezeigt werden, dass bei isolierter Belastung des Streckers die nach dem Beuger einsetzende Streckerkontraktion bereits zugleich mit dem Beuger oder unmittelbar nach ihm einsetzt, und frühzeitig eine relativ grössere Höhe als der unbelastete Strecker erreicht. Entsprechendes gilt bei isolierter Belastung des Beugers, Diese Erfahrungen werden angewandt auf die Bewegungstypen des Spastikers, Hypotonikers, der Rigidität bei Paralysis agitans sowie beim Zittern dieser Krankheit. Hieran schliessen sich Ueberlegungen, die die Art des Mechanismus der koordinierten Willkürbewegungen beim normalen und unter krankhaften Bedingungen und die anatomischen Beziehungen betreffen.

G. Steiner (Heidelberg)

587. Rohden, F. van, Ueber Reaktionsversuche an 220 normalen und pathologischen Soldaten. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **62**, 333.

Für die klinische Praxis genügen die klassischen Reaktionsversuche (einfache Reaktion, Unterscheidungs- und Wahlreaktion) nicht; sie müssen durch natürlichere Versuchsanordnung ergänzt werden (Zuordnungs- und Aufmerksamkeitsreaktionen). Bei den Gesunden nimmt die Aufmerksamkeitskonzentration und damit gleichzeitig die Qualität der Reaktionsleistung bei den "lebenswahren" Versuchanordnungen zu im Vergleich mit den 3 klassischen Reaktionen. Die pathologischen Versuchspersonen zeigen in sämtlichen Reaktionen eine Minderwertigkeit im Vergleich mit den normalen. Charakteristische Aenderungen der Reaktionskurve haben sich ergeben bei angeborenem Schwachsinn und Schwächezuständen nach Hirnverletzungen einerseits, bei Hysterischen und

simulierenden Hirnverletzten andererseits. Uebung bessert in den meisten Fällen von Hirnschädigung die Leistung ganz erheblich.

HAYMANN (Freiburg)

588. WIERSMA, E. D., Die psychologische Auffassung einiger Reflexe. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **72**, 254.

Zwischen den Reflexen und den höheren Willensäusserungen bestehen nur graduelle Unterschiede: es lassen sich Uebergänge zwischen beiden nachweisen. Reflexe können sich aus willkürlichen Bewegungen entwickeln, die Reaktionszeiten beider sind nur gradweise verschieden; ein Teil der Reflexe ist zweckmässig und kann sich wie Willkübewegungen veränderten Verhältnissen anpassen; Aufmerksamkeit und andere seelische Vorgänge können auf Ihren Ablauf einwirken.

HAYMANN (Freiburg)

589. KRAEPELIN, E., Arbeitspsychologische Untersuchungen. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **70** 230.

Es handelte sich dem Verfasser um Geschicklichkeitsmessungen. Es wurden zunächst planmässig die Arbeitskurven beim Aufziehen von Perlen untersucht und es ergab sich, dass der Verlauf der Arbeitsleistung sich ganz ähnlich gestaltete wie bei entsprechenden Rechenversuchen. Nun wurde die Beeinflussung der Geschicklichkeit durch körperliche und geistige Tätigkeit untersucht (Einschaltung von Ruhepausen, Einschaltung anderer körperlicher oder geistiger Arbeit), dann Giftworkungen (Alkohal). In einer anderen Versuchsreihe wurden die Wirkungen der Willensanspannungen geprüft, dann diejenigen von gemütlichen Einflüssen, insbesondere die Wirkungen der Erwartung auf die Geschicklichkeit.

HAYMANN (Freiburg)

6. ATTENTION, MEMORY AND THOUGHT

590. POFFENBERGER, A. T., The Subconscious—What is It? *Sci. Mon.*, 1922, **14**, 379–390.

Phenomena apparently involving the subconscious range all the way from retention of an experience till a later recall to hysterical blindness and to the so-called phenomena of telepathy. But scientific method discounts explanation by a new concept if older concepts can successfully be employed. It is held that adequate recognition of

neurograms, of their intricate facilitations and inhibitions, of instinctive and other determining tendencies, or redintegration, and of expectation and suggestion, will suffice to render unnecessary an additional concept of the subconscious.

J. F. DASHIELL (North Carolina)

591. WITMER, L., Intelligence—A Definition. *Psychol. Clinic,* 1922, **14**, 65–67.

Intelligence is the ability to solve a new problem. It may appear at any intellectual level, even, at a low one, and is divined from what the individual makes of opportunity and resources. Intelligence is not to be measured by conventional standards, but by the successful outcome of performance. No one has ever devised an intelligence test that tests intelligence and nothing else. Intelligence is displayed in a performance that succeeds against adverse odds; stupidity is failure despite favoring odds.

M. E. GALLAGHER (Pennsylvania)

592. HINRICHSEN, O., Das Verhältnis von "innen" und "aussen" in der Psyche. *Zeits. f. d. ges. Neurol. u. Psychiat.,* 1921, **65**, 68.

H. versucht, Aehnlichkeiten zwischen Traum und Wahnsinn sowie zwischen Traum und dichterischer Produktionsphase herauszuarbeiten und an ihnen das Verhältnis von "aussen" und "innen" in der Psyche zu beleuchten. Im Traum besteht sozusagen keine Aussenwelt mehr. In der Krankheit kann es zu völliger Abkehr von der Wirklichkeit kommen. Bei dem Produktiven kommt es mindestens in den Zeiten des Schaffens zu einer solchen Abkehr, was aber nicht als Minderwertigkeit gedeutet werden darf, da jedes bedeutsame Schaffen zugleich einen recht engen Anschluss an die Wirklichkeit in den Zeiten ausserhalb der Schaffensperiode zur Voraussetzung hat, einen Anschluss, wie ihn eben nur der Gesunde, nicht der Kranke hat.

HAYMANN (Freiburg)

593. LÖWY, P., Die Beziehungen zwischen Psyche und Statik. *Zeits. f. d. ges. Neurol. u. Psychiat.,* 1921, **65**, 141.

Welche Funktionen regulieren die Statik unseres Körpers im Raum und sein Verhalten zur Schwerkraft? Die labyrinthären und cerebellaren Eigenapparate (das Wirken der—statomotorischen—

Physiostatik) sind bekannt; dazu tritt aber nun die Psychostatik, statische Phänomene, die von psychischen Funktionen abhängen. L. unterscheidet: (1) die rezeptive Elementarpsychostatik, welche physiostatische Reize in Bewusstseinselemente umsetzt; (2) die Endopsychostatik, welche die durch jene gegebenen Elemente unter sich und mit den übrigen psychischen Funktionen zu Komplexen verarbeitet; (3) die Psychostatomotilität, zu welcher die bewusste Regulierung der unter konstanter Aufmerksamkeit vorgenommenen Bewegungen und die Automatismen gut eingeübter Bewegungen gehören, ferner, im Gegensatz zu diesen unbewusst, die Gruppe der attentionell induzierten Mitbewegungen. Quantität und Qualität, Richtung, associative Verkettung, Aktionsbereitschaft und Bewusstseinsbereitschaft, Verankerung in der Aufmerksamkeit dieser Phänomene wechseln und können namentlich in pathologischen Fällen erheblich vom Durchschnitt abweichen.

HAYMANN (Freiburg)

594. ROBACK, A. A., Intelligence and Intellect. *J. of Philos.*, 1922, **19**, 325-331.

What is intellect and what is intelligence? This question occasions the writing of this paper. One word may become a technical term because of scientific usage and another may be relegated to popular parlance. Such is the case with the words "intelligence" and "intellect." The former has a greater range of application while the latter appears to apply to conceptual thinking. Animal intelligence became one of the most widely used phrases in psychology, thanks to Romanes. Warren thinks that intelligence as applied to animal during the eighties and nineties acquired a behavioristic meaning. It is likely that all educated persons apply the terms in different connections somewhat. Thorndike seems, in his Animal Intelligence, to regard the words as interchangeable.

However, the writer believes the distinction between intelligence and intellect to be a very genuine one and it is just this: intellect should be regarded as a chain of the most essential intelligences into a system. Caesar was probably more intelligent than Marcus Aurelius but the latter had probably the greater intellect. One man may get along with people though he may not be able to understand them and on the other hand another person may not but at the same time he may have keener insight into their affairs and he should be regarded as the more intellectual. The intelligent man "lives in a

shed extending over a vast area; the man of intellect dwells in a sky-scraper." The secret of intellect is coördination and that on a large scale. Herder, Schopenhauer, and Carlyle would seem to typify the intellectual of modern times. Intelligence is more comprehensive and relates to the situations to be met with by the individual. An intelligent person may be lacking in singlemindedness. Not so the intellectual.

T. R. GARTH (Texas)

595. McCOMAS, H. C., A Measure of the Attention. *J. of Exper. Psychol.*, 1922, **5**, 1–18.

The materials for this experiment consisted of a cardboard screen with a small ground glass window in the center behind which were four electric lamps of different colors. When one of these colored lights appeared at the window the observer was expected to react upon the key which extinguished that light. This action not only extinguished the light, but served also to present another colored light to which *O* again responded by the appropriate reaction. This form of continuous reaction was maintained for periods of ten minutes. The task demanded a high degree of concentration, but was of a nature which prevented indifference or loss of interest on the part of the observers. The scores of right and wrong reactions, with due allowance made for chance reactions, were used as measures of attention. Eleven observers with various degrees of laboratory training took part in the experiment, which was conducted during the second semesters of two college years.

Even for a small group of eleven observers the scores show marked differences in speed and accuracy of reaction, and in the temporal variations in these factors. Although the results lead to no conclusive generalization regarding the nature of attention, they do bear witness very clearly to the applicability of this type of experiment to the detection of attentional fluctuations.

The times for such continuous discrimination reactions are longer than those discrimination reactions in which intervals for recovery and preparation are introduced. Periodic variations in scores, which at first were thought to be indicative of diurnal variations, turn out to be effects of specific tasks such, *e.g.*, as close application to memory work or long periods of class work just before the experimental session. It is interesting to note that the observers' introspections give no reliable indication of the objective "efficiency" in perform-

ing the task. Often when an observer thinks he is making his best performance, he is in reality doing poorly, and *vice versa.*

C. C. PRATT (Harvard)

596. THORNDIKE, E. L., The Effect of Changed Data upon Reasoning. *J. of Exper. Psychol.*, 1922, **5**, 33–38.

Whereas the older psychology regarded reasoning as a force largely independent of associative habits, our present psychology defines reasoning as the organization and coöperation of habits rather than as a special activity. The present investigation furnishes evidence of the truth of the correlated theorem that "any disturbance whatsoever in the concrete particulars reasoned about will interfere somewhat with the reasoning, making it less correct or slower or both."

A group of ninety-seven graduate students were given two sets of nine tasks in algebra. Each pair of tasks demanded the application of the same principle, but the concrete situation in one case was one made more or less familiar by associative habits, whereas in the other case the concrete particulars were somewhat altered. The per cent wrong or incomplete for the nine tasks in which customary associations were favored was 34.4, and for the nine in which some change was made, 54.2. C. C. PRATT (Harvard)

597. VIX, W., Die Philosophie des Als-Ob in ihrer Anwendung auf den Begriff des Bewusstseins und des Unbewussten. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **64**, 83.

V. gibt zunächst einen Ueberblick über den Streit um das Unbewusste, wie er sich in den letzten Jahren abgespielt hat, und kommt zu dem Ergebnis, dass Unbewusstes immer nur erschliessbar sei, vorstellbar nach Analogie mit den bewussten seelischen Phanomenen. Die Begriffe bewusst und unbewusst lassen sich eben nur im Sinne von Fiktionen (*Vaihinger*) herausarbeiten. Für Psychologie und Psychopathologie sind die Begriffe Bewusstsein und Unbewusstes wertvolle Als-Ob-Betrachtungen.

HAYMANN (Freiburg)

598. HOFFMANN, R. A. E., Grundlinien der normalen und anormalen seelischen Konstitution. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **66**, 128.

Zur Aufstellung von Typen sind grundsätzlich "die beiden Wertmasstäbe des Vitalen und Transcendentalen anzulegen." Die beiden

Wertigkeiten brauchen sich durchaus nicht zu entsprechen. Es wird versucht, Typen herauszuarbeiten, bei denen die Körperlichkeit mit der seelischen Konstitution bezw. ihren vitalen und transcendentalen Kräften in gesetzmässigen Beziehungen steht. Die 3 Typen sind: der asthenische (unterdurchschnittliche), der normale (durchschnittliche), der sthenische (überdurchschnittliche). Als sekundär-degenerative Typen werden aufgestellt: der Psychastheniker, der Neurastheniker, der Hysterische und der Depressiv-Manische.

HAYMANN (Freiburg)

7. SOCIAL FUNCTIONS OF THE INDIVIDUAL

599. HALL, G. S., Notes on the Psychology of Recreation. *Ped. Sem.*, 1922, **29**, 72–79.

A general analysis of types of humor is given with lists of quoted cases, including the humor arising from children's trial and error attempts to understand puns, the types centering about obscenity, religion, women, death, drunkenness, exaggeration (American), etc. Mention is made of Spencer's "descending incongruity" theory; and repeated hints are given of the author's "recapitulation" and "katharsis" concepts.

J. F. DASHIELL (North Carolina)

600. PETERS, C. C., Notes on Methods of Isolating Scientifically the Objectives of Religious Education. *Ped. Sem.*, 1921, **28**, 369–381.

J. F. DASHIELL (North Carolina)

601. CURTIS, H. S., Children's Lies. *Ped. Sem.*, 1921, **28**, 382–390.

Descriptive statements are made of the different kinds, degrees, and correction methods of children's lying.

J. F. DASHIELL (North Carolina)

602. MCCALL, W. A. AND HUESTIS, B. L., Mental and Physical Effects of Fresh Air. *Sci. Mon.*, 1922, **14**, 131–139.

There has not yet been a really valid experiment to show whether open air schools are desirable or undesirable.

J. F. DASHIELL (North Carolina)

603. STRONG, E. K., JR., Control of Propaganda as a Psychological Problem. *Sci. Mon.*, 1922, **14**, 234–252.

Propaganda has in late years become a serious problem in social psychology. It involves the deliberate development by the agent of a sentiment on the part of a group of people, then the precipitation of their action through mere suggestion. Social control of propaganda is eminently desirable. It seems not completely possible, as a form of control in terms of truth or falsity of statements made in various propaganda, nor in terms of the social value of the actions aimed at; but in terms of the emotional elements involved more adequate publicity methods would go far toward being effective.

J. F. DASHIELL (North Carolina)

604. VITELES, M. S., Job Specifications and Diagnostic Tests of Job Competency Designed for the Auditing Division of a Street Railway Company. *Psychol. Clinic*, 1922, **14**, 83–105.

Viteles concerns himself with the development of job specifications and diagnostic tests of job competency for the auditing division of a street railway company. The purpose of this study is to outline the general method of procedure in developing specifications and tests of job competency and to discuss their application in the selection and maintenance of an effective working force in one unit of a particular organization.

M. E. GALLAGHER (Pennsylvania)

605. STOLTENBERG, H. L., Sinnenkunst und Uebersinnenkunst. *Zeits. f. Aesthetik u. allge. Kunstwiss.*, 1921, **16**, 1–17.

Auf "psychologischer" Grundlage, deren Unzulänglichkeit durch gewaltsame Wortneubildungen nicht gemildert wird, versucht der Verfasser eine Einteilung der Künste nach einzelnen Sinnesgebieten und ihren allgemeinen "Ordnungsformen." Diese horizontale Gliederung wird ergänzt durch eine übergreifende vertikale—durch eine Schichtung nach "Sinnenkunst" und "Uebersinnenkunst." Zwei Seelen, eine Sinnenseele und eine Uebersinnenseele "stecken" im Kunstwerk. Die Uebersinnenseele umfasst alles das, was durch die "Empfindungen an Vorstellungen und Gedanken vermittelt werden soll." Damit ist die alte Fechnersche Unterscheidung eines direkten und eines assoziativen Faktors im Kunstwerk, noch dazu in erheblicher Vergröberung, wieder lebendig geworden.

SANDER (Leipzig)

606. Carrière, P., Musikalische Verwandtschaft und Vertreterschaft. *Zeits. f. Aesthetik u. allgem. Kunstwiss.*, 1921, **16**, 98–109.

Abweichend vom Gebräuchlichen lässt C. als Verwandtschaft nur das Verhältnis zwischen den Tonarten gelten, die um einfache Grundschritte voneinander entfernt sind. Diesem Prinzip der tonalen Bewegung wird das Prinzip der tonalen Gleichwertigkeit gegenübergestellt und als musikalische Vertreterschaft bezeichnet. Dem Durgeschlecht wird eine natürliche Vorherrschaft zugeschrieben; in der Auffassung des Mollgeschlechtes schliesst sich C. noch unmittelbar an Helmholtz an. Das Problem der Doppelklänge wird angedeutet, aber das Festhalten des Begriffes Alteration als eines melodischen Prinzipes verhindert eine rein harmonische Auffassung. Das Nebeneinander von Stufenbezeichnungen und Funktionsbuchstaben (bes. in den schematischen Darstellungen) ist ein Ausdruck der Prinzipienvermischung.

R. Wicke (Leipzig)

607. Staehlin, W., Die Wahrheitsfrage in der Religionspsychologie. *Arch. f. Religionspsychol.*, 1921, **2-3**, 136–159.

Nicht die Frage nach der Wahrheit der Religion, sondern nur die Frage, wie der Gläubige den Wahrheitsanspruch seiner Religion erlebt, kann ein Untersuchungsgegenstand der Religionspsychologie sein. Einige Momente und Formen dieses Wahrheitsanspruches werden treffend analysiert.

C. Bühler (Dresden)

608. Behn, S. Von methodischer Selbstbeobachtung in der Religionspsychologie. *Arch. f. Religionspsychol.*, 1921, **2-3**, 160–189.

Nach Beseitigung verschiedener Einwände legt Verf. dar, wie die Methode der Selbstboebachtung in der Religionspsychologie zu verwerten sei.

C. Bühler (Dresden)

609. Wunderle, G., Zur Psychologie der Reue. Ergebnisse einer Umfrage. *Arch. f. Religionspsychol.*, 1921, **2-3**, 39–107.

Ein Fragebogen über das Erlebnis der Reue vor der Beichte wurde von 30 Vpn. katholischer Konfession und grossenteils geistlichen Standes ausführlich beantwortet, und diese Antworten ver-

sucht der Verf. psychologisch auszuwerten. Endgültige Ergebnisse konnten in den psychologisch entscheidenden Fragen noch nicht erzielt werden.

C. Bühler (Dresden)

610. Geyer, C., Zur Psychologie der Predigtvorbereitung. *Arch. f. Religionspsychol.*, 1921, **2-3**, 4–38.

Verf. schildert die Entstehung zweier Predigten, die im Verlauf je einer Woche zustandekommen. Irgend eine weltanschauliche religiöse Ueberzeugung, die den Verf. beschäftigt, steht im Mittelpunkt, gibt das Thema, und was im Laufe der Woche an Assoziationen sich bietet, wird aufgegriffen. Erlebnisse, Erinnerungen, Gedanken und Einfälle, die in die Richtung des Zieles weisen, werden im Text der Predigt mit verabeitet.

C. Bühler (Dresden)

611. Clemen, C., Wesen und Ursprung der Magie. *Arch. f. Religionspsychol.*, 1921, **2-3**, 108–135.

C. bespricht kritisch verschiedene Auffassungen vom Wesen und Ursprung der Magie und kommt dazu, die Magie swar nicht in Gegensatz zur Religion, aber zum kultus zu bringen, da dieser beseelte Wesen voraussetzt, während jene ursprünglich keine Seele, sondern nur Kräfte in Menschen und Dingen annimmt.

C. Bühler (Dresden)

612. Voigtländer, E. u. Gregor, A., Geschlecht und Verwahrlosung. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **66**, 97.

Der Mann ist auch in seinen Delikten "objektiver" als die Frau, die sich vielfach durch Nebenumstände leiten lässt und ihre Taten komplizierter und persönlicher motiviert, dabei ihre "affektive Logik" heranziehend. Und diese Geschlechtseigentümlichkeiten zeitgen sich schon bei Kindern, selbstverständlich ohne absolut durchgreifend zu sein. Nicht selten zeigen verwahrloste Knaben körperlich feminine Züge.

Haymann (Freiburg)

613. Kollarits, G., Normalzustand und Ausnahmezustand in der Völkerpsyche. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **66**, 337.

In den massenpsychologischen Ausnahmezuständen wird die Masse homogener, als sie es normalerweise ist; statt der Argumente

wirken Suggestionen, oft der absurdesten Art; die Verfolgung einzelner überwertiger Ideen tritt an die Stelle der gleichmässigen Arbeit auf verschiedenen Gebieten; Teilorganisationen verfolgen ihre Parteiziele (nationaler religiöser, parteipolitischer Richtung) und verlieren den Sinn für ein Aufgehen im Ganzen. Die Wirkung ist Abbau, Zerfall.

HAYMANN (Freiburg)

8. SPECIAL MENTAL CONDITIONS

614. LANDAUER, K. Das Sichstrecken. *Zeits. f. d. ges. Neurol. u. Psychol.*, 1920, **58**, 296–309.

Im Schlafe und im Kauern ist durch willkürliche Abdämmung der Reize aus der Aussenwelt, durch Ruhigstellung und Dehnung der Strecker eine Hypotonie eingetreten. Durch die starke Innervierung fast der gesamten Muskulatur beim Sichstrecken werden lebhafte Reize von der Muskulatur und den Gelenkflächen zentralwärts gesandt, die die Vorderhornzellen tonisieren. Verstärkend wirkt die Annäherung der Insertionspunkte der Strecker unter gleichzeitiger Dehnung der Antagonisten. Dadurch vermehrte Spannkraft und erhöhte Ansprechbarkeit für willkürliche Bewegungen.

G. STEINER (Heidelberg)

615. KAISER, I. J., The Thrill in Relation to the Lesser Conscious States. *Ped. Sem.*, 1921, **28**, 323–368.

Consciousness is described as accentuated form of the "thrill" aroused by sensory stimulation, partly automatized habits and the subconscious phenomena being lesser forms. Thrill-craving as a seeking of physiological well-being or belief is made fundamental to an interpretation of various normal and abnormal association processes in preference to psychoanalytic interpretations.

J. F. DASHIELL (North Carolina)

616. JASTROW, J., The Will to Believe. *J. Amer. Med. Ass.*, 1922, **78**, 1891–1893.

Willetta Huggins, age seventeen, blind and deaf, exhibited before the Chicago Medical Society what seemed to be ability to perceive colors through her sense of smell, and to distinguish spoken sounds through her tactile organs. Jastrow's conclusion is that the girl, while not having central vision, has a slit-wise vision by means of

which she gets color sensations. In bringing articles near her nose, they fall within the field of this vision. She gets no color sensation when closely blindfolded or when in a dark room. Further, she can perceive checkered colors. As to her perceiving spoken words through touch organs, Jastrow believes that she is again deceived, that the sound vibration undoubtedly reaches her through the ears. He made rigid tests here as well as of color perception, and reasons logically to his conclusion. He believes that the girl probably deceives herself as well as others, but suggests the possibility of intentional deception. The author says, "The purpose of the present statement is to place medical men on their guard in accepting conclusions of this order, and to call their attention to the technical requirements of a really rigid test."

R. H. Sylvester (Drake)

617. Robinson, E. S. and Herrmann, S. O., Effects of Loss of Sleep (1). *J. of Exper. Psychol.*, 1922, **5**, 19–32.

The results of this experiment were obtained from three subjects who went without sleep from the ordinary rising time one day until the ordinary retiring time the second night following, a period of from sixty to sixty-five hours. The subjects were given dynametric, reading, aiming, tapping, and mental multiplication tests once each day beginning several days before the period of insomnia and continuing four or five days after the insomnia.

Qualitative effects from loss of sleep, such as nervousness, headache, dizziness, irritability, disturbance of speech, and the like, were more or less marked in all three *O's*. The quantitative data from the tests, however, were practically negative. In so far as the scores showed any positive effect, they showed a deleterious one. But with the exception of one or two cases the variations in performance during the period of insomnia were no wider than the variations preceding or following insomnia.

C. C. Pratt (Harvard)

9. NERVOUS AND MENTAL DISORDERS

618. Bickel, H., Ueber affektive und intellektuelle Wahnideen Eine pathopsychologische Studie. *Zeits. f. d. g. Neurol. u. Psychol.*, 1920, **58**, 94–132.

Wahnideen entstehen aus er Tätigkeit der Phantasie, andererseits aus einem Versagen der Urteilsfähigkeit. Verf. unterscheidet

zwischen affektiven und intellektuellen Wahnideen. Bei den ersteren sind die verursachenden pathologischen Bestimmungen entweder primärer Natur (manisch-depressives Irresein) oder die Begleiterscheinungen einer primären Ideenflucht oder Denkhemmung. Der subjektive Realitätswert der affektiven Phantasiegebilde beruht entweder auf einer relativen Urteilsschwäche gegenüber stark gefühlsbetonten Vorstellungen oder auf einer Demenz bzw. Trübung des Bewusstseins. Intellektuelle Wahnideen entstehen aus einer von der übrigen Hirnrinde dissozierten autochthoner Tätigkeit der Vorstellungszentren, oder aus einer gesteigerten Assoziationstätigkeit der Hirnrinde, Ihren Inhalt erhalten auch die intellektuellen Wahnideen vielfach von Abnormitäten de Gefühlslebens.

G. Steiner (Heidelberg)

619. Popper, E., Lidnystagmus und inkomplette Ptosis. *Zeits. f. d. g. Neurol. u. Psychol.*, 1920, **58**, 49–93.

Neben lokalisatorischen Erörterungen gibt Verf. hauptsächlich Hinweise auf die Bedeutung des Lidnystagmus für die hirndynamische Erklärung der Erregungshemmung und Reizdiffusion. Der Fall, von dem er ausgeht, ist eine multiple Sklerose mit charakteristischem Nystagmus nach links und einer leichten Ptosis des rechten Oberlides. Beim Blick nach rechts fehlt der Nystagmus, dagegen kommt es zu einem Lidnystagmus des rechten Oberlides; beim Blick nach links Bulbusnystagmus mit stärkerem Lidnystagmus des rechten Augenlides, als beim Blick nach rechts. Auf dem ptotischen Lid ist der Lidnystagmus viel stärker zu beobachten als auf dem gesunden Oberlid. Die Eigenart des Falles ist eine wichtige Stütze für die Diffusionstheorie, insofern angenommen wird, dass die Reizdiffusion in den rechten unvollständig geschädigten Levatorkern hineinkommt, während der intakte linke Kern der Reizdiffusion mehr Widerstand bietet, wie der stets geringere Lidnystagmus auf dem linken Auge beweist.

G. Steiner (Heidelberg)

620. Koch, R. und Riese, W. Das psychische Verhalten bei alimentärer Osteopathie. *Zeits. f. d. ges. Neurol. u. Psychol.*, 1920, **58**, 42–48.

Hinweis auf die Eigentümlichkeit des Gesichtsausdrucks bei den osteomalacischen Frauen und die Eigenart der Haltung des ganzen Körpers, die am besten als ein lauerndes Gespanntsein bezeichnet

wird: gleichsam eine dauernde Tränenbereitschaft. Der Gesichtsausdruck ist nicht unähnlich dem eines Menschen, der vor einem Tränenausbruch steht. Bei der psychischen Untersuchung zeigt sich eine dauernde Affektstörung nach der Seite der Depression hin. Dazu gesellt sich eine Art Absperrung von den Dingen und Menschen, die Aehnlichkeit mit Negativismus hat. Im Assoziationsexperiment waren die Reaktionszeiten durchweg erhöht; Gegenteilsreaktionen wurden bevorzugt. Eine erhöhte Ermüdbarkeit wird angenommen und eine krankhafte Müdigkeit. Die psychischen Veränderungen, die gegenüber den Veränderungen Klimakterischer abgegrenzt werden, waren äusserst hartnäckig.

G. Steiner (Heidelberg)

621. Bassoe, P., Problems Confronting the Section on Nervous and Mental Diseases. *J. Amer. Med. Ass.*, 1922, **78**, 1857–1858.

The present demand for information and guidance in psychology and psychiatry is due to the psychanalytic and mental hygiene movements; to the unsuspected amount of feeblemindedness and psychoneuroses found in men drafted during the war; to the part of psychoneuroses in swelling the number of war casualties; to official recognition of these conditions; and to social unrest, crime waves, and the revival of many forms of occultism following the war. The medical profession should educate its members so as to meet the demands and not pass them by default to the nonmedical psychologists. The field of psychopathology is being invaded by all kinds of lay psychanalysts and psychologists, some of them well trained and well meaning, others dangerously contaminated by occultism, obscurantism, commercialism or by all of these. Psychology and psychiatry must be taught in the medical schools. Neurology and psychiatry must not be separated and assigned to two groups of specialists. Each specialist must know both. Medical expert testimony in questions involving insanity and mental responsibility is badly handled. The present practice of selecting experts who appear in court with a partisan label is pernicious. It thwarts justice, tempts discriminating people to question the exactness of our knowledge and to doubt the sincerity of physicians giving testimony in such cases. Something must be done to establish standards and guides for physicians and for the legal profession as well.

R. H. Sylvester (Drake)

622. GOODALL, E., A Note on the Diastase Content of the Urine in 120 Cases of Mental Disorder. *J. of Ment. Sci.*, 1922, **68**, 1–5.

The author states that out of 120 cases of various kinds of mental disorder, as seen in a public institution, there is no evidence, excluding one possible case, of pancreatic disease, as indicated by the urinary diastase test.

R. E. LEAMING (Pennsylvania)

623. STANFORD, R. V. AND GOODALL, E., The Passage of a Barium Sulphate Meal in Ten Cases of Dementia Praecox. *J. Ment. Sci.*, 1922, **68**, 5–7.

A report of tests with barium sulphate, recorded by radiograms, in ten cases of dementia praecox. In five out of ten cases spasticity of the colon was noted. The spasticity of involuntary muscle-fibers is interesting in view of the like condition (rigidity or rigid immobility) noted in respect of voluntary muscles in some cases (catatonic) of dementia praecox.

R. E. LEAMING (Pennsylvania)

624. FORD-ROBERTSON, W. Chronic Bacterial Infection in Cases of Dementia Praecox. *J. Ment. Sci.*, 1922, **68**, 8–17.

Evidence is brought forth in this article to show that extremely severe chronic infective conditions occur in cases of dementia praecox, the action of which is known to be neurotoxic: that these chronic bacterial infections are the most important of several factors that determine the mental disorder: that they are the direct cause of the morbid process in the brain that destroys its efficiency as a mechanism.

R. E. LEAMING (Pennsylvania)

625. GOOD, T. S., The Oxford Clinic. *J. Ment. Sci.*, 1922, **68**, 17–23.

The Oxford Clinic for Nervous Disorders came into being in 1918 with Dr. Good and Dr. W. McDougall in charge. It was hoped that cases with mental symptoms would be attracted to this clinic and opportunity for treatment would be given while certification, which is so much dreaded by these cases, could be avoided. The title of the clinic seems to have allayed the suspicions of "*mental cases*" and many have been successfully treated in the clinic.

R. E. LEAMING (Pennsylvania)

626. Brown, W., Psychology and Psycho-Therapy. *J. Ment. Sci.*, 1922, **68**, 23–32.

The author discusses the terms "suggestion" and "autosuggestion" in comparison with the term "psychoanalysis" which connotes a certain method and theory all its own. He shows that the prime factors involved are much the same and proposes his own term "autognosis" as a name for the therapeutic measure which is an analysis directed toward the patient's past life which enables him to get an insight into his present condition.

R. E. Leaming (Pennsylvania)

627. Mapother, E. and Martin, J. E., Fantasies of Childhood and Adolescence as a Source of Delusions. *J. Ment. Sci.*, 1922, **68**, 33–48.

A report of a patient with a psychosis where the content was in the main, a morbid reaction to an earlier fantasy and where the mechanism was unusually clear.

R. E. Leaming (Pennsylvania)

628. Beaton, T., Change of Phase in the Psychoses. *J. of Ment. Sci.*, 1922, **68**, 48–54.

In cases of early psychotic derangement the subject is confronted with a set of novel experiences which are different from any which has been undergone previously in the individual life. To the patient these experiences are perfectly real and they become the dominant factor in determining the direction of the flow of interest or attention. The patient must attend to them, he must think about them, he must reason them out. If the capacity for intelligent thought remains active the compound of delusional sentiments grows and coheres; the patient ceases to think about his experiences, he takes them for granted and settles down to his new adjustment, which takes the form of one of the recognized types of the psychoses.

If the patient develops a confusion, a very different course of events follows. First, the continued addition of strengthening perceptory experience must cease because the processes underlying intelligent association are no longer operative. Secondly, the organization of the new experience is badly strained, its intensity and clarity are markedly reduced in proportion to that of previous experience, according to the rule that the latest acquirement is the first to be lost. Finally, influence can now be brought to bear on the patient, who, owing to his difficulty of intelligent thought, cannot meet argument

with argument and is therefore more capable of taking a suggestion. His perceptual experience is more likely to be dominated by the original compound of sentiments developed prior to his psychosis, and in consequence he is more amenable and easier to handle.

In conclusion the author emphasizes the necessity of not allowing the systematic classification, which is applicable to long standing cases, to obscure the fact that the early case almost always shows change of phase before the secondary final adjustment is reached. He, furthermore, draws attention in regard to the particular phase of confusion to that very old tradition that an acute infectious disease, probably accompanied by delirium, is often beneficial to a mental patient so far as his future mental state is concerned.

R. E. Leaming (Pennsylvania)

629. Bedford, P. W., The Goldsol Test in Mental Disease. *J. Ment. Sci.*, 1922, **68**, 54–66.

If anyone had been able to devise a less intricate test for syphilis, the Wassermann reaction would never have survived to the present day. It is one of the most complicated methods that have been applied to diagnosis in medicine. The goldsol test, on the other hand, consists merely in making a series of ten saline dilutions of the spinal fluid to be examined and adding thereto a small quantity of the goldsol reagent. The performance of the test itself requires only fifteen minutes. The result may be read a few hours later and it is interpreted according to the degree of precipitation of the gold that has occurred—as evidenced by the various color-changes in the goldsol and according to the particular dilutions of spinal fluid most affected by these changes.

A summary of the established facts regarding the goldsol test is given as follows: 1. Typical well-marked reactions are obtained only in general paralysis, taboparesis and juvenile paresis; and the percentage of positive reactions is 95 in these diseases. 2. Normal fluids give negative reactions. 3. The goldsol reaction is more sensitive than the Wassermann reaction, quite as reliable, and probably of more value in the early diagnosis of neurosyphilis. 4. The test is helpful in the recognition of acute poliomeylitis. 5. It may prove to be of much more value in the diagnosis of congenital syphilis than any other tests hitherto employed. 6. Important facts in its favor are: its simplicity minimizing chances of error, its performance occupying only a few minutes, and its need of but two or three drops of

spinal fluid. 7. Its chief drawback is the uncertainty of being able to prepare a good goldsol at every attempt.

The present day tendency to exalt laboratory diagnosis at the expense of clinical experience is liable to cause extravagant claims to be made for such a test as this. But it must be borne in mind that a diagnosis cannot be centrifuged nor extracted, nor even precipitated from a spinal fluid, and that any expectation of obtaining an infallible and characteristic laboratory test is unreasonable.

R. E. LEAMING (Pennsylvania)

630. WHITELAW, W., The Colloidal Gold Reaction in the Cerebrospinal Fluid. *J. Ment. Sci.*, 1922, **68**, 66–74.

The author explains and emphasizes the technique of the colloidal gold reaction, describes the reaction observed, the results obtained with the reaction, and the nature of the reaction, which is not yet fully understood.

His conclusions regarding the test are as follows: 1. The colloidal gold reaction is a laboratory test, and can be performed rapidly with a minimal amount of cerebrospinal fluid. 2. Extreme care is necessary in the cleaning of glassware and the preparation of the reagents. 3. The paretic reaction occurs in dementia paralytica with great constancy but is obtained in some other conditions, and so results from a laboratory test such as this should be considered in relation to the other evidence in the case, both clinical and pathological, as the tendency might be to depend too much on an unknown test of this kind at the expense of the other facts. 4. Wider use should be made of the test in order that numbers will eliminate discrepancies.

R. E. LEAMING (Pennsylvania)

631. KRAEPELIN, E., Ueber Entwurzelung. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **63**, 1.

Unter Entwurzelung versteht K. das Herausgerissenwerden einer Persönlichkeit aus dem kleineren oder grösseren Kreis, in welchen sie hineingeboren war. Die Folge einer solchen Entwurzelung sind für Verstand, Gemüts- und Willensanlagen sehr weittragende. Die Entwurzelung kann schicksalsmässig oder infolge persönlicher Eigenschaften erfolgen. Neben der Anlage des Individuums sprechen bei den Folgezuständen mit die Tiefe des Risses, die Art der neuen seelischen Eindrücke, das Alter usw. Besondere Typen der Entwurzelten sind der unehelich Geborene und der Frühverwaiste. In einem

gewissen Alter ist die Entwurzelung eigentlich ein fast normaler Vorgang. Eine besondere Bedeutung kommt noch der nationalen bezw. sprachlichen und der religiösen Entwurzelung zu.

HAYMANN (Freiburg)

632. SCHULTZ, J. H., Ueber psychologische Leistungsprüfungen an nervösen Kriegsteilnehmern. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **63**, 326.

Der Verfasser hat seine Untersuchungen unmittelbar hinter der Front, in einem Genesungsheim, angestellt, wohin die Fälle unmittelbar aus vorderster Linie kamen. Er prüfte die psychische Leistungsfähigkeit (unter Ausschluss der Intelligenz) vor allem an einfachen Reproduktionen. Geprüft wurden Fälle von Gasvergiftung, Gehirnerschütterung, Kopfverletzungen, organischen Nervenleiden, nervöser Erschöpfung, psychopathischer Konstitution, Depression, Schwachsinn und Kriminalität-, alles teilweise überlagert durch funktionelle Zutaten. Von den Ergebnissen sei nur einiges erwähnt. Das Merken von 7 Ziffern ist schwerer als das von 4 sinnlosen Silben. Bei der Merkfähigkeitsprüfung ist bei einmaliger Exposition von sinnlosem Material vor Ueberlastung zu warnen die die Differenzen verwischt. Bei Depression ist häufig ausserordentliche Herabsetzung der Reproduktionstreue und des freien Reproduzierens nachweisbar. Bei Neurasthenien und Schreckneurosen bestehen Aufmerksamkeits- und Konzentrationsstörungen, welche die objektive "Gedächtnisschwäche" erklären.

HAYMANN (Freiburg)

633. BLEULER, E., Ueber unbewusstes psychisches Geschehen. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **64**, 122.

Tausendfältige Erfahrung zeigt, dass es Funktionen gibt, von denen man direkt keine Kenntnis hat, die aber in allem übrigen ganz den bewussten analog sind (Wahrnehmungen, Denken, Affekte, Wollen); wir bezeichnen sie in ihrer Gesamtheit als das Unbewusste. Dass man sich über dieses Unbewusste so viel streitet, beruht auf 2 Missverständnissen: (1) man meint, um das Unbewusste zu kämpfen, während man in Wirklichkeit seine Anschauungen über Gehirn und Seele mitteilt; (2) man geht von verschiedenen Anschauungen über die Psyche aus und versteht deswegen die Worte des andern garnicht oder falsch.

HAYMANN (Freiburg)

634. SCHNEIDER, K., Pathopsychologische Beiträge zur psychologischen Phänomenologie von Liebe und Mitgefühl. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **65**, 109.

In den Kreis seiner Betrachtungen zieht der Verfasser nur solche Störungen des Mitfühlens und der Liebe, die als Störungen erlebt werden, also nicht die des ethisch Defekten, des Gehirnkranken, des Schizophrenen. Mitgefühl ist in der Liebe fundiert, Verstehen ist eine Voraussetzung, aber nicht das Wesen des Mitgefühls. Leidensfähigkeit und grösseres eigenes Leiden verfeinern das Verstehen. In pathologischen Fällen (für die der Verfasser kennzeichnende Beispiele anführt) kann tatsächliche Herabsetzung jener Phänomene bestehen, und zwar habituell oder entwicklungsmässig oder prozessmässig. Es kann vorkommen, dass ein Entfremden des gesamten Erlebens dem Erlebenden auch diese Akte entfremdet. Es kann infolge Versenktseins in eigene Gefühle das Verstehen fehlen. Es kann bei depressivem Grundzustand infolge vermehrten eigenen Leidens das Mitleid gesteigert, die Mitfreude vermindert sein.

HAYMANN (Freiburg)

635. KOLLARITS, J., Die Störung im psychischen Weltgefüge. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **65**, 331.

Den Ausgangspunkt der Störungen sieht K. im rückständigen, unwissenschaftlichen, von überwertigen Gefühlen und Ideen irregeleiteten Komplex des politischen Denkens überhaupt und der Politiker im besonderen, wie es sich in den letzten paar Jahren manifestiert hat. Natürlich haben auch die anatomischen und physiologischen Veränderungen, welche diese Jahre gebracht haben (Unterernährung, grosse Strapazen, Vermögensverluste, Zerstörung von Menschenleben und wertvollen Materialien, Verlassen der Arbeitsgewohnheiten) psychische Folgen und Begleiterscheinungen gehabt. Aufgabe der biologisch gerichteten Psychologie ist es, die Zusammenhänge zu erkennen, Abhilfe zu schaffen; heute ist sie dazu noch nicht fähig; aber sie muss an Kräften benützen, was ihr jeztzt schon zur Verfügung steht; vor allem Verwertung der Massensuggestibilität, Ausschliessung alles Schmarotzertums, Zusammenschluss aller arbeitenden Schichten, Erweckung der Arbeitsfreude.

HAYMANN (Freiburg)

636. Kiss, J., Ueber das Vorbeizeigen bei forciertem Seitwärtsschauen. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **65**, 14.

Bei forciertem Seitwärtsschauen ist unter physiologischen Verhältnissen fast in jedem Falle ein Vorbeizeigen feststellbar. Die Richtung des Vorbeizeigens ist in den meisten Fällem identisch mit der Richtung des Schauens und geschieht nur mit jener Hand, nach deren Richtung die Augen gewendet sind. Manchmal verkleinert Uebung die Amplitude des Vorbeizeigens.

Haymann (Freiburg)

637. Schlesinger, H., Erkrankungen des Nervensystems durch Nährschäden und Hunger. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **59**, 1–18.

Die Unterernährung während des Kriegs zeigte Häufung bekannter oder Auftreten bisher unbekannter Krankheiten in reicher Fülle. In das Gebiet des Nervenarztes gehören von Krankheiten die mit Sicherheit auf eine ungenügende Ernährung oder auf eine falsche Zusammensetzung der Nahrung zurückzuführen sind: (1) Beri-Beri, (2) Polyneuritis nach Kriegsödem und Scorbut mit oder ohne funikulare Myelitis, (3) Hungertetanie, (4) Spasmen einzelner Muskelgruppen bei der auf Hunger beruhenden Knochenerweichung, (5) Pellagra, (6) verschiedene Neuralgien, (7) Verschlimmerungen von organischen toxisch-infektiösen Nervenerkrankungen.

Haymann (Freiburg)

638. Mollweide, K., Symptomenkomplexe und Krankheitsbilder in der Psychiatrie in ihren Beziehungen zu psychomotorischen und psychosensorischen Grundmechanismen. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **59**, 19–63.

Verfasser versucht, die psychiatrischen Symptomenbilder aufzuteilen zwischen psychomotorischen und psychosensorischen und rechnet z. B. das manische Symptomenbild zu den ersten, das depressive zu den zweiten, da bei jenem die erleichterte Auslösung aller Willensabtriebe, des Rede- und Betätigungsdranges sowie die eng damit verbundene Erregung der Denkvorgänge, die Ideenflucht, wesentlicher seien als die Affektstörung, während umgekehrt bei depressiven Symptomenbildern die traurige Verstimmung, das Insuffizienzgefühl, die Kleinheitsideen als das Wesentliche anzusehen seien, aus denen sich Denk- und Willenshemmung erst sekundär ergeben. Zu den psychomotorischen Störungen wären dann weiter die kata-

tonischen Symptome zu rechnen, während die bei den gleich Kranken vorkommenden halluzinatorischen und paranoiden Zustandsbilder weiderum zu den psychosensorischen Mechanismen zu rechnen wären.

HAYMANN (Freiburg)

639. ROSENTHAL, S., Ueber Anfälle bei Dementia praecox. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **59**, 168–216.

Epileptiforme Anfälle und anfallsähnliche Zustände können bei der Dementia praecox entweder psychologisch motiviert erscheinen oder aber als organische, cerebrale Symptome. Das Bestreben des Verfassers ist es, unterscheidende Merkmale für die beiden Möglichkeiten zu finden. Die Entstehungsbedingungen und der Verlauf geben sie nicht, der Ausgang nur dann, wenn er tödlich ist oder dauernde psychische Schädigungen hinterlässt, wodurch dann die organische Natur bewiesen ist. Das wichtigste und sicherste Unterscheidungsmerkmal ist das Auftreten des Babinskischen Reflexes; alle anderen Reflexanomalien beweisen den organischen Ursprung weniger sicher.

HAYMANN (Freiburg)

640. SCHILDER, P., Ueber Identifizierung auf Grund der Analyse eines Falles von Homosexualität (ein Beitrag zur Frage des Aufbaus der Persönlichkeit). *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **59**, 217.

Identifikation besteht darin, dass sich ein Individuum Personen der Wirklichkeit oder der phantasierten Umwelt gleichsetzt und diese Gleichsetzung in Symptomen—Handlungen oder Phantasien—zum Ausdruck bringt. Eine theoretische Erklärung des Begriffs lag bisher nicht vor. Sch. versucht nun, Wesen und Bedeutung an der Hand eines Falles zu erfassen, und kommt dadurch dazu, den Begriff zu verengern gegenüber seinem Schöpfer Freud, nämlich nur für die In-Einssetzung der eigenen Person mit anderen Personen, nicht für die Einssetzung verschiedener fremder Persönlichkeiten. Die nahen Beziehungen zu dem Begriff der Projektion werden herausgearbeitet.

HAYMANN (Freiburg)

641. SCHILDER, P., Ueber Gedankenentwicklung. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **59**, 250–280.

Vorstellungen und Gedanken müssen verschiedene Stufen durchlaufen, ehe sie zur Klarheit gelangen. Der Entwichlungsprozess

einer Vorstellung geht über Vorstellungen, die nach Aehnlichkeit und Kontiguität assoziiert sind. Dabei sind unentwickelte Vorstellungen der affektiven Umbildung besonders zugänglich. Der anschauliche Bewusstseinsinhalt spielt eine geringe Rolle im Vergleich mit den nicht anschaulichen Denkerlebnissen. Bei der Dementia praecox treten als Endergebnis der Denkprozesse Gebilde auf, die normalerweise nur Durchgangsphasen in der Entwicklung des Gedankens sind, und ebenso bei primitiven Völkern, und zwar sind es vor allem symbolische Vorstellungen, die jene Stufen der Gedankenentwicklung charakterisieren.

HAYMANN (Freiburg)

642. SCHNEIDER, K., Die Schichtung des emotionalen Lebens und der Aufbau der Depressionszustände. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **59**, 281.

Der Verf. macht sich die Phänomenologie des emotionalen Lebens zu eigen, die Scheler in seinem Buche "Der Formalismus in der Ethik und die Materialwertethik" gibt, und er unterscheidet dementsprechend: (1) sinnliche Gefühle, (2) Leibgefühl und Lebensgefühl, (3) rein seelische Gefühle (Ichgefühl), (4) geistige Gefühle (Persönlichkeitsgefühl). In der motivlosen (endogenen) Depression überwiegt die Störung der Lebensgefühle, die das ganze Bild beherrschen, während sie bei der reaktiven Depression nur sekündären Charakter haben. Die beiden Störungen liegen also in verschiedenen emotionalen Schichten. Aus solch verschiedener Schichtung werden auch die manisch-depressiven Mischzustände verständlich.

HAYMANN (Freiburg)

643. MAYER-GRON, W., Ueber die Stellungnahme zur abgelaufenen akuten Psychose (eine Studie über verständliche Zusammenhänge in der Schizophrenie). *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **60**, 160.

Zunächst wird das emotionale Gedächtnis, wie es die Psychologie des Gesunden zeigt, kurz dargestellt. Die Stellungnahme zur abgelaufenen akuten Psychose ist ja nur ein Sonderfall des wichtigen psychologischen Problems der Stellungnahme des Ichs zu seiner eigenen seelischen Vergangenheit. In den Kreis der eigentlichen Betrachtung werden dann jene zahlreichen Nachstadien der akuten Schizophrenie gezogen, die nicht vollkommene Heilungen mit Einsicht in die überstandene Krankheit, aber auch nicht fortdauernde

Krankheit sind; hier wird nach verständlichen Zusammenhängen geforscht. Dabei ergaben sich folgende Möglichkeiten der Stellungnahme: (1) "Verzweiflung" über die Zerstörung der Existenzwerte (mit der Tendenz zum Selbstmord), (2) "Neues Leben," d. h. eine Resignation mit bewusstem Verzicht auf Kontinuität mit der Vergangenheit, (3) "Ausscheidung" d. h. möglichste Verdrängung der Krankheit auch im Gedächtnis, (4) "Bekehrung," wobei die frühere Zeit der Gesundheit als etwas Minderwertiges, die Krankheit als die Stunde der Wiedergeburt angesehen wird, (5) "Einschmelzung," wobei das Krankheitserlebnis in das Kontinuum der Persönlichkeitsentwicklung restlos aufgenommen wird.

HAYMANN (Freiburg)

644. KOLLARITS, J., Unterbrechungs- und Abwechslungsgefühle bei nervösen und nicht nervösen Menschen. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **60**, 255.

Die Wirkung des durch fremdes Eingreifen verursachten Abbrechens angefangener psychischer Reihen, etwa einer Handlung, einer Reaktion, einer Melodie, eines Affekts, ist verschieden je nach dem Stadium, in welchem es eintritt; im Spannungsstadium ist es unlustbetonter als im Lösungsstadium; ebenso ist die Unlust grösser, wenn die Gefühls- oder Reaktionskurve steil ansteigt, als wenn sie sich langsam hebt. Verschieden ist das Gefühl auch je nach der Plötzlichkeit und nach der Vollständigkeit des Abbrechens. Die Unterbrechung unlustbetonter Geschehnisse ist natürlich lustbetont.

HAYMANN (Freiburg)

645. LÖWENSTEIN, O., Ueber den Nachweis psychischer Vorgänge und die Sugestibilität für Gefühlszustände im Stupor. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **61**, 304.

Der Zweck der Versuche war, den Einfluss von Suggestiv-Reizen auf stuporöse Kranke festzustellen und aus etwaigen Reaktionen Rückschlüsse zu ziehen auf möglicherweise zugrunde liegende seelische Vorgänge. Es wurden mit entsprechenden Apparaten geprüft (1) der Puls, (2) die Atmung, (3) die Bewegungen der Extremitäten und des Kopfes. Um Vergleichsmaterial zu gewinnen, wurden die Ver, suche zunächst bei Geistesgesunden angestellt. Es ergab sich dabei, dass die "Methode der unbewussten Ausdrucksbewegungen" in einer Anzahl von Fällen dazu befähigt, nicht allein

den Nachweis zu erbringen, dass bestimmte Reize eine andere psychische Wirkung hervorbringen als andere, sondern es gelang mit ihrer Hilfe auch, experimentell erzeugte Bewusstseinsinhalte qualitativ zu bestimmen. Bei den Stuporfällen wurden angewandt: Spannungs-, Beruhigungs-, Lust-, Furcht-, Erregungs- und Schreckreize. Alle Stuporen erwiesen sich als hochgradig beeinflussbar durch Gefühlsreize; alle zeigten unbewusste Ausdrucksbewegungen mannigfaltigster Art; dabei traten aber grosse individuelle Verschiedenheiten hinsichtlich des Masses der Ausdrucksbewegungen wie in der Ansprechbarkeit für die verschiedenen Reizqualitäten hervor.

HAYMANN (Freiburg)

646. ARAI, K., Cholin als Hormon der Darmbewegung. VI. Mitteilung. Experimentelle Therapie der Magendarmlähmung nach Peritonitis und Laparotomie. *Arch. f. d. ges. Physiol.*, 1922, **193**, 359–395.

Intravenöse Einspritzung von Cholinchlorid beseitigten auch die Magendarmlähmungen nach experimenteller Peritonitis (nach intraperitonealer Einspritzung von Jodlösung und nach Laparotomie mit Eventrieren der Magendarmabschnitte und Manipulieren derselben an der Luft.). Der Cholingehalt des Dünndarms war nach beiden Experimenten nicht unter der Norm. In Verbesserung früherer Angaben wird gezeigt, dass Cholin auch den isolierten Dickdarm erregen kann (dabei kein Unterschied zwischen proximalem und distalem Colon!) Durch Tierversuche wurde die tödliche, toxische und die unschädliche Cholindosis im Verhältnis zur therapeutisch wirksamen untersucht. Arai glaubt durch diese Experimente "eine sichere Basis für die therapeutische Anwendung des Cholins bei Magendarmlähmungen des Menschen gegeben" zu haben.

HAPPEL (Frankfurt a/M.)

647. PLANT, J. S., Rating Scheme for Conduct. *Amer. J. of Psychiat.*, 1922, **1**, 547–572.

This is a detailed report and discussion of the system used at McLean Hospital, Massachusetts, for the rating (by the nurses) of the conduct of the patients. This system would be especially applicable to psychiatric hospitals. It deserves the attention of those who are interested in the classifications and ratings of conduct.

B. J. JONES (Boston Psychopathic Hospital)

648. Strecker, E. A., A Preliminary Study of the Precipitating Situations in Two Hundred Cases of Mental Disease. *Amer. J. of Psychiat.*, 1922, **1**, 503–536.

The effort of the paper is to formulate some judgment concerning the precipitating situations in 100 cases of dementia praecox and 100 of manic depressive psychoses, the cases being practically consecutive admissions at the Pennsylvania Hospital, Department of Nervous and Mental Diseases. The intrinsic value of the entire situation in each case has been classified as significant, important, doubtful, and insignificant or absent. The progress made in the investigation is promising, but the number of cases is too small to permit of definite conclusions. Significant precipitating situations occurred in 25% of the patients, the somatic factors of which were influenza, overwork, the climacteric and complicated childbirth, the psychic factors cruelty, illness and death of relatives, and unhappy love affairs. Significant and important factors were 12% more frequent in manic depressive. The proportion of somatic and psychic factors were practically the same for both diseases, the somatic predominating in the significant and important situations and the psychic in the doubtful and insignificant. An extension of the pre-psychotic emotional tone into the psychosis was noted in 62.5% of the significant-important situations in manic depressive and 30% of the schizophrenic, but much less in the doubtful and in none of the insignificant cases. The proportion of normal heredity was considerably higher in the groups with serious precipitating circumstances in both diseases, 18% in manic depressive and 14% in dementia praecox. An abnormal personality occurred with greater frequency in cases without adequate exciting factors, the percentage difference being 13% and 24%, respectively. Much valuable information may be gained by a consistent and thorough analysis of the pre-psychotic history.

S. Allen (Boston Psychopathic Hospital)

649. Brown, Sanger, and Davis, T. K. The Mental Symptoms of Multiple Sclerosis. *Arch. of Neurol. and Psychiat.*, 1922, **7**, 629–634.

A cursory view of the subject shows that there is not a consistent group of mental symptoms in multiple sclerosis. However, if euphoria is included, probably 90% of cases show mental alterations which would warrant the term "mental symptoms," which are largely overshadowed by the physical symptoms. The patient's physical condition renders him incapable of carrying out anything

which would lead to commitment. Hence it is not surprising to find only three cases of multiple sclerosis among 6,700 insane patients in the Manhattan State Hospital. It has not been possible to demonstrate any predisposition to mental disease; the mental symptoms seem more dependent upon the organic brain disease. The symptoms are grouped, first, as those which are primary and directly the result of the organic lesions, such as euphoria, mental defect symptoms with hallucinations of organic origin and rare confused states, and Korsakoff's psychosis, also the occasional terminal states with grandeur; second, those which are incident and secondary, such as transitory delusional states and depressions, apparently arising from the condition in which the patient finds himself, and suicidal attempts and delusional trends of a few months' duration. However, marked distortion of thought and oddities of conduct so frequent in dementia praecox are not encountered in multiple sclerosis. The clinical picture is not that of paresis nor that of cerebral arteriosclerosis, but rather more like the symptoms occasionally seen in brain tumor. It is reasonable to suppose that the secondary symptoms, such as depressed and paranoid states, depend to a considerable degree upon the mental make-up of the patient before the disease developed.

S. Allen (Boston Psychopathic Hospital)

650. Ball, J. D., Industrial Psychiatry. *Amer. J. of Psychiat.*, 1922, **7**, 639–678.

Dr. Ball describes in considerable detail the services rendered by a psychiatrist to one industrial organization—a California oil company—as an instance of what may be done by psychiatrists in industry. The psychiatrist has charge of the study, placement, and therapy of pathological cases among employees. But the chief contribution of the paper is to show that the function of the psychiatrist is wider than this; he is responsible for employment (hiring and "firing") and careful follow-up study of each case placed; for "morale" and the right direction of motives of all persons in the industry; and for systematic study of all those maladjustments, personal and social, which make for friction. It seems strange that not only these extensive services, but even such activities as job-analysis come within the psychiatrist's domain. But the answer is not far to seek: the job-analysis and the cause of friction are *psychological* matters—they concern individual adaptation to environment—in other words, the psychiatrist is both a psychiatrist and a psychologist.

That the coöperation of employers, men's shop committees, and rank and file has been attained appears clear from the account given of discussions between the psychiatrist and individuals with grievances to be righted—the psychiatrist's success *par excellence* is shown in removing causes of such grievances. The success of the whole undertaking appears to be due chiefly (1) to the versatility of the individual psychiatrist, and his capacity to handle widely different activities; (2) to a habit of letting every one in the industry know exactly what he is about, so that coöperation is willingly given. The author gives clear and helpful illustrations of each subject discussed: we have samples of the psychological tests used, of the procedures followed in removing individual and social friction, of job-analysis in relation to placement, etc. It is therefore possible to judge just how far Dr. Ball's methods would apply in detail to different industrial situations.

G. Murphy (Boston Psychopathic Hospital)

651. Toepel, H., Zur Psychologie der lesbischen Liebe. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **72**, 237.

Die beim Manne ziemlich scharf gezogene Grenze zwischen Homosexualität und Pseudohomosexualität ist beim weiblichen Geschlecht stark verwischt. Unter den lesbischen Frauen ist zu unterscheiden eine Gruppe, wo eine Frau in der Partnerin den Mann sucht, und eine zweite, wo sie die Frau liebt. Jede dieser Formen zerfällt wieder in vier Typen, je nachdem ob mit der männlichen oder weiblichen Leiblichkeit des Objekts dessen männliche oder weibliche Intention gefordert wird.

Haymann (Freiburg)

652. Kollibay-Uter, H., Ueber die Jahreskurve geistiger Erkrankungen. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **65**, 351.

Im Frühsommer steigen überall die Aufnahmeziffern der Irrenanstalten an. Ist das bedingt durch eine Zunahme der Psychosen oder durch andere Gründe, vielleicht wirtschaftlicher Natur? Aus der Durcharbeitung eines sehr grossen Materials (mehr als 13,000 Fälle) ergibt sich, dass die Häufung frischer Erkrankungsfälle ausschlaggebend ist, nicht ein soziales Moment; vielleicht sind sphärische Einflüsse letzten Endes verantwortlich zu machen.

Haymann (Freiburg)

653. Grafe, E. u. Traumann, E., Zur Frage des Einflusses psychischer Depression und der Vorstellung schwerer Muskelarbeit auf den Stoffwechsel. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **62**, 237.

Hat die bei Gesunden und bei Kranken im Anschluss an seelische Verstimmungen zu beobachtende Gewichtsabnahme ihre Ursache in einer Erhöhung des Stoffwechsels? Um diese Frage zu klären, suggerierten die Verff. gesunden Versuchspersonen in der Hypnose schwere Schicksalsschläge bezw. schwere Muskelarbeit. Die Beobachtung des Gasstoffwechsels hatte (begreiflicherweise) kein eindeutiges Ergebnis.

Haymann (Freiburg)

654. Jossmann, P., Das Problem der Ueberwertigkeit. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **64**, 1.

J. gibt einen vergleichenden kritischen Ueberblick über die Geschichte des Problems, bringt dann eine psychologische Analyse der Ueberwertigkeit als Erlebnis und erörtert zuletzt kurz die Bedeutung des Ueberwertigkeitserlebnisses für die Psychose.

Haymann (Freiburg)

655. Ebstein, E., Ueber den Pavor nocturnus (sog, Alpdrücken) und sein familiäres Auftreten. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **62**, 385.

Es werden die Stammbäume zweier, miteinander verwandter Familien mitgeteilt, in denen in 2 Generationen das Alpdrücken ungemein häufig auftrat (das weibliche Geschlecht ist überwiegend befallen). Voraussetzung für das Zustandekommen des Alpdrückens sei eine nervöse Disposition oder eine familiäre Anlage.

Haymann (Freiburg)

656. Popper, E., Der schizophrene Reaktionstypus. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **62**, 194.

Der schizophrene Reaktionstypus its eine Disposition (ähnlich anderen endogenen Reaktionstypen wie dem hysterischen, dem depressiven, dem epileptoiden). Vom schizophrenen Krankheitsprozess ist er streng zu sondern.

Haymann (Freiburg)

657. MARCUSE, H., Zur Begründung der "energetischen Theorie der Psychosen." *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **67**, 335.

Die energetische Theorie verwendet den Begriff der psychischen Kraft als Friktion im Sinne *Vaihingers*, d.h. als ob es eine solche Kraft gäbe, als ob es verschiedene Entwicklungsstufen der psychischen Kraft gäbe.

HAYMANN (Freiburg)

658. MEGGENDORFER, F., Klinische und genealogische Untersuchungen über "Moral insanity." *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **66**, 208.

Aus der klinischen Gruppe der moralische Minderwertigen werden zwei Untergruppen nach klinischen und erbbiologischen Gesichtspunkten herausgehoben. Die erste umfasst moralisch Verkommene, die zugleich Zeichen der Affektepilepsie zeigen (nie echte Epilepsie in der Familie), niemals jedoch "epileptisch verblöden." Die 2. Untergruppe wird charakterisiert dadurch, dass die moralischen Defekte erst in der Pubertätszeit hervortreten und zwar, im Gegensatz zu den vorigen, bei Angehörigen völlig gesunder und moralisch einwandfreier Familien; es scheine also wahrscheinlich, dass hier ein Krankheitsprozess vorliege, der vielleicht in die Gruppe der Dementia praecox gehöre.

HAYMANN (Freiburg)

659. GERSTMANN, J. und SCHILDER, P., Zur Frage der Mikrographie. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **67**, 347.

Bei der Mikrographie werden die Schriftzeichen allmählich kleiner, während ihre Form unverändert bleibt. Sie trat, wie auch sonst oft. Bei Encephalitis lethargica auf. Während die einen sie als Folge von Spannungszuständen auffassen, möchten die Autoren für diesen Fall annehmen, dass ein Zusammenhang zwischen der Mikrographie und der bestehenden Akinese vorlag, d.h. der Verarmung an automatischen Einstellungsbewegungen und an spontanen Bewegungsantrieben. Ihre Ursache hat die Mikrographie wahrscheinlich in Veränderungen der Stammganglien des Gehirns.

HAYMANN (Freiburg)

660. Hoop, I. H. van der, Ueber die causalen und verständlichen Zusammenhänge nach Jaspers. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **68**, 9.

Jaspers sagt: Durch Hineinversetzen in Seelisches verstehen wir genetisch, wie Seelisches aus Seelischem hervorgeht; durch objektive Verknüpfung mehrerer Elemente zu Regelmässigkeiten auf Grund wiederholter Erfahrungen erklären wir causal. Gegen diese Auffassung erhebt Hoop Einwände. Die Definition des causalen Erklärens ermangele der nötigen Schärfe und gebe dadurch im Gebrauch Anlass zu Missverständnissen. Hinsichtlich der verständlichen Zusammenhänge entgehe Jaspers die wichtige Rolle, welche die eigene Introspektion spiele. Aus den undeutlichen Formulierungen seiner Begriffe konstruiere Jaspers dann den Gegensatz zwischen causalen und verständlichen Zusammenhängen, der in Wirklichkeit so nicht existiere.

Haymann (Freiburg)

661. Schnabel, J., Die Prognose der psychischen Störungen des Kindes- und Entwicklungsalters nach dem Material der Züricher Psychiatrischen Klinik von 1870 bis 1920. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **68**, 241.

Betrachtet man die erbliche Belastung durch Psychosen, Selbstmord und Trunksucht im Durchschnitt ganzer Krankheitsgruppen, so findet man eine Parallele zu dem besseren oder schlechteren Verlauf der kindlichen Psychosen, während bei dem einzelnen Fall dieses Verhältnis natürlich oft nicht zu konstatieren ist. (Wie weit der hereditäre Einfluss für das Zustandekommen der Psychose überhaupt mitspricht, bedarf noch der Klärung durch Statistiken über die Ascendenz gesunder Kinder, für die bis jetzt Vergleichszahlen fehlen.) Eine durchaus gute Prognose hat die kindliche Hysterie.

Haymann (Freiburg)

662. Schilder, P., Vorstudien zu einer Psychologie der Manie. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **68**, 90.

Auch in der Manie spielen "Komplexe" eine Rolle. Man muss sich vorstellen, dass jeder seelische Konflikt Abwehrkräfte in Bewegung setzt, welche das unangenehme Erleben bewältigen und aus der Bewältigung Lust ziehen wollen, aber auch das Individuum zu neuen Aufgaben befähigen, ihm Aktionsfreiheit geben. Lust und Aktion nennt Sch. manisches Fluidum. Es wird schon normalerweise

bereit gestellt gegen drückende Probleme. Verschwindet das Problem, so wird das Fluidum frei, und wir haben die Manie; oder aber das Problem verschwindet nicht, dann wirkt es als Reizquelle für die Fluidumproduktion, bis schliesslich "das Reservoir überflutet"; oder endlich: das Problem wirkt sich wahnhaft aus, und die Wahnvorstellung eröffnet die Reservoire. Die Fassungskraft des Reservoirs ist das biologische Moment. Damit fügt sich die Manie dem Wechselspiel von psychischer und somatischer Causalität ein.

HAYMANN (Freiburg)

663. REISS, E., Ueber formale Persönlichkeitswandlung als Folge veränderter Milieubedingungen. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **70**, 55.

Eingehende psychologische Analyse eines hypomanisch Veranlagten, der sich unter dem Einfluss eines neuen Milieus und dem Zwange eines Berufswechsels aus einem Lebemann zu einen Bussprediger wandelt; in beiden Äusserungsformen trat der ursprüngliche Charakter zutage; es handelte sich also nicht um eine tiefgehende Wandlung, sondern um eine Aenderung der "Fassade."

HAYMANN (Freiburg)

664. DE JONG, H., Die Hauptgesetze einiger wichtigen körperlichen Erscheinungen beim psychischen Geschehen von Normalen und Geisteskranken. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **70**, 61.

Der Verf. arbeitete zunächst, um kritisch Stellung nehmen zu können, zu den teilweise widersprechenden bisherigen Ergebnissen der Plethysmographie eine Methode aus, die es ermöglicht, den Faktor der Bewegung und der Atmung von der psychischen Reaktion zu trennen. Er teilt die Ergebnisse mit, die er mit dieser Methode bei Gesunden und Kranken im normalen und subnormalen Spannungszustand der peripheren Gefässe gefunden hat. Auf Grund dieser Ergebnisse stellt er die Hauptgesetze des Plethysmogramms auf. Schliesslich gelangt er zu einer Theorie, welche die bei Katatonikern zu beobachtenden Erscheinungen—Gefässpasmus, Muskelspannungen, Pupillenphänomene—einheitlich zusammenfasst. Er fand, um nur dies hier zu erwähnen, dass die plethysmographische "Normalreaktion" auf psychische Reize nur im subnormalen und normalen Spannungszustand der peripheren Gefässe auftritt, dass sie nur quantitative, keine qualitativen Variationen aufweist, und dass

sie von der psychischen Tätigkeit als solcher ausgelöst wird, unabhängig davon, ob es sich um Lust oder Unlust, psychische Arbeit, Erregung oder Spannung handelt. Bei übernormaler Spannung der Gefässmuskulatur kann die Gefässreaktion auf Reize nur eine geringe sein, sodass der Effekt der Herztätigkeit in den Vordergrund gerückt wird; bei noch spärkerer Spannung fehlt schliesslich jede plethysmographische Reaktion. HAYMANN (Freiburg)

665. MAYER-GROSS, W., Beiträge zur Psycho-Pathologie schizophrener Endzustände. 1. Mitteilung: Ueber Spiel, Scherz, Ironie und Humor in der Schizophrenie. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **70**, 232.

Zwei Arten von spielender Einstellung lassen sich herausheben: das lebhafte Spielen mit den Erlebnissen in der beginnenden akuten Psychose und das beruhigte ausgeglichene Spielen des erfahrungsgereiften Endzustandes. Abweichungen der Komik des Schizophrenen von der des Gesunden werden verständlich aus der inneren Freiheit und der Atmosphäre von Gefühllosigkeit, in der er lebt. Die Ironie des Schizophrenen steht im Zusammenhang mit der Ambivalenz, ist bequemer Ausdruck der Ueberlegenheit und dient der verschlossenen Innerlichkeit des Schizophrenen. Auch der "grosse Humor" ist dem Schizophrenen nicht fremd.

HAYMANN (Freiburg)

666. LURJE, W., Autismus und Buddhismus—eine Parallele. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **70**, 25.

Für alle Hauptsymptome der Schizophrenie (Abstumpfung der Gefühle, Entfremdung, Verwaschenheit der Grenzen zwischen Ich und Aussenwelt, Symbolisches Denken, Stereotypien, Haltungsstörungen, Autismus) finden wir in der Lehre Buddhas Parallelen, und L. nimmt deshalb an, dass die schizophrene Art des Denkens in allen Menschen latent vorhanden sei, dass es aber der Rasseneigentümlichkeit des Orientalen entspreche, wilkürlich in dieser Art zu denken. HAYMANN (Freiburg)

667. HÜBNER, A. H. u. LÖWENSTEIN, O., Das krankhafte Motiv als Tatbestandsmerkmal. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **62**, 402.

Von dem gesunden Motiv, das bestimmt wird als "die Vorstellung eines Zwecks, sofern sie Antrieb zur Tat wird," ist das krankhafte

Motiv dadurch unterschieden, dass in ihm die beharrliche Zweckvorstellung fehlt, dass in ihm der objektive Erfolg mehr oder weniger zufällig ist, weil der subjektive Erfolg der eigentlich gewollte ist. Wo in psychischen Grenzzuständen ein für diese charakteristischer Zustand auftritt, für den die kriminelle Handlung nur Symptom ist, das ist diese Handlung subjektiv bestimmt und nich objektiv gerichtet, und damit fehlt ihr ein wesentliches Moment für die Erfüllung des Tatbestandes eines Delikts. Die Rechtspflege muss also die pathopsychologie des Motivs systematisch ausbauen.

HAYMANN (Freiburg)

668. SCHNEIDER, K., Bemerkungen zu einer phänomenologischen Psychologie der invertierten Sexualität und erotischen Liebe. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **71**, 346.

Die sexuelle Einstellung ist eine phänomenologische Letztheit und ist als solche nicht definierbar, kann nur erschaubar gemacht werden. Sie wird zur erotischen Liebe, wenn alle Werte um die geliebte Person kristallisiert werden. In der Sexualpsychologie sind besonders drei Gesichtspunkte auseinanderzuhalten: (1) Nach welcher Richtung strebt die Sexualität? Ist sie unterwerfend oder hingebend? (2) Wie sind die entsprechenden Richtungen des Liebespartners? (3) Wie ist dessen Leib? Aus der wechselnden Zusammenordnung dieser drei Gesichtspunkte ergeben sich die Typen. Und es kommt dabei nicht auf die primären Geschlechtszeichen an, um den phänomenologischen Tatbestand "invertierter" Erotik zu erzielen.

HAYMANN (Freiburg)

10. INDIVIDUAL, RACIAL, AND SOCIAL PSYCHOLOGY

669. DUBLIN, L. I., The Mortality of Foreign Race Stocks. *Sci. Mon.*, 1922, **14**, 94–104.

1. The several races that make up the foreign-born population of New York are variable as to their natural vigor. 2. Excepting the Russians (mostly Jews) the expectation of life for the foreign born is less than for the native born of native parentage. 3. The Russians have the best expectation, followed in order by the Italians, the English-Scotch-Welsh, the Germans, and lastly the Irish. 4. Excepting the Russians and Italians, the mortality is higher among these races living in New York than in their native countries. 5. This

condition may be due to difficulties of adjustment to new conditions of life; or to poorer quality of immigrants as compared with those staying at home; or to both.

J. F. DASHIELL (North Carolina)

670. GROSSMAN, W., Endokrine und psychische Mechanismen in der Aetiologie der Sexualinversion. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **62**, 309.

G. nimmt an, dass die Grundlage der Homosexualität immer eine spezifische Abartung im System der Drüsen mit innerer Sekretion, vor allem der Geschlechtsdrüsen sei, da auch das Centralnervensystem in jenen Fällen, wo der Ausgangspunkt der Erscheinungen dort zu liegen scheine, eine weitgehende Abhängigkeit vom innersekretorischen Apparat zeigt, mit dem es in zahlreichen Wechselbeziehungen steht; akzidentelle Faktoren (also vor allem seelische Erlebnisse) sind für die homosexuellen Empfindungen und Handlungen wohl gelegentlich von Bedeutung.

HAYMANN (Freiburg)

11. MENTAL DEVELOPMENT IN MAN

671. BACKWARD, A. M., Backward Boys. *Ped. Sem.*, 1921, **28**, 391–394.

Many striking cases from biography show that backwardness in school work is not necessarily indicative of failure in life.

J. F. DASHIELL (North Carolina)

672. LOWELL, F., AND WOODROW, H., Some Data on Anatomical Age and Its Relation to Intelligence. *Ped. Sem.*, 1922, **29**, 1–5.

The individual "ages" of 402 Minneapolis and St. Paul children were determined in terms (a) of radiographs of hands and wrists, (b) of number of permanent teeth, and (c) of the Kuhlmann 1917 revision of the Binet tests. Two chronological age groups, the 7½- and 10½-year groups, were selected as most adequate for a study of correlations. Coefficients were found to be low but positive between (a) and (c), (b) and (c), and (a)-(b) and (c), the last being somewhat higher than the others. Explanation of a distinctly low correlation between (a) and (c) was sought in the theory that different bodily structures may develop at different times. Carpal and teeth development, then, are not reliable indices of intelligence

from a practical point of view; yet they are distinctly more reliable than height.

Some valuable incidental points are given. A detailed scale of radiographs showing anatomical ages from 5½ to 11½ is offered for comparison. It is shown that differences between the sexes in height should be shown not in absolute amounts but in terms of proportion of final adult height; this will correct some apparently anomalous facts. Accelerated development of girls as compared with boys was found for carpal development, number of permanent teeth, and height. Striking ranges of individual differences were found in both carpal development and number of teeth.

J. F. DASHIELL (North Carolina)

673. STILLMAN, M. C., Practical Talks for Parents and Teachers. *Ped. Sem.*, 1922, **29**, 16–43.

Suggestions are given for direct and indirect sex instruction at different ages of childhood.

J. F. DASHIELL (North Carolina)

674. FULLER, R. G., Child Labor and Child Nature. *Ped. Sem.*, 1922, **29**, 44–63.

Child labor does injustice to the motor emphasis in childhood, to the wholesome play tendencies, and makes for nervous-mental disorders. Proper children's work could be arranged to obviate these. The school shows ignorance of child nature by neglecting the individual.

J. F. DASHIELL (North Carolina)

675. FULLER, R. G., Child Labor and Mental Age. *Ped. Sem.*, 1922, **29**, 64–71.

Early school leaving probably may not be due chiefly to inferior intelligence. A plea is made for more recognition of the welfare of children in society.

J. F. DASHIELL (North Carolina)

676. TERMAN, L. M., Adventures in Stupidity: A Partial Analysis of the Intellectual Inferiority of a College Student. *Sci. Mon.*, 1922, **14**, 24–40.

A summary is given of scores in Stanford-Binet, Yerkes-Bridges, Yerkes-Rossy, Army 1917 Individual, Kent-Rosanoff, and a variety of other intelligence and school attainment tests made by a certain

college student who failed in all his courses; the total scores ranging from 12 to 13½ years. Analysis of his performances on the tests shows that he "responds normally to simple situations directly sensed, and that his inferiority is chiefly evident in responses involving intellectual initiative, planning, range, and flexibility of association, analysis of a situation into its elements, alertness, and the direction of attention toward the significant aspects of experience. . . . he is not adept in the formation and manipulation of concepts . . . he is unable to master the intellectual shorthand of general ideas." Such an individual is incapacitated for taking up a profession or high-grade business position, but is able to work at many of the lines involving more concrete and more routine work.

J. F. DASHIELL (North Carolina)

677. GESELL, A., Mental and Physical Correspondence in Twins. *Sci. Mon.*, 1922, **14**, 305–331, 415–428.

I. A brief survey of scientific knowledge of twins is given. II. The twin sisters A and B, nine years of age, who had always shown remarkable resemblance, were given a series of tests. Their physical and anthropometric measurements, including dentition, skin patterns, cranial and carpal bones, tapping, dynamometer, etc.—even a birth mole—show striking similarities and frequent identities. Their Binet, performance, and other intelligence examinations, also educational tests, revealed further high similarities and frequent identities (I Q respectively 183 and 183 plus). III. The denial, as by Thorndike, of the possibility of two distinct types of twinning well-known to biological and medical men (fraternal or dizygotic and duplicate or monozygotic) is met by a description of manifold factors tending to alter the degree of resemblance or disparity of both types. These factors are germinal, post-germinal, genetic, developmental, and environmental. Their combined action may obscure bi-modality of the distribution curve for twin resemblances. Even within the monozygotic type it is held that the range of individual difference is incomparably greater than among unselected pairs of individuals.

J. F. DASHIELL (North Carolina)

678. FERNBERGER, S. W., Statistical and Non-Statistical Interpretation of Test Results. *Psychol. Clinic*, 1922, **14**, 68–72.

Fernberger draws some interesting conclusions from the results of a survey made by the Psychology Department of the University

of Pennsylvania to determine standards for children of the fifteen-year-old level. He holds that mental tests, as they are now developed, show such a degree of variability within a relatively homogeneous group that the differences between two groups do not have statistical significance, even though the differences may be great. If tests are to have a diagnostic value, which means great variability within the group, we can never hope to obtain differences between groups which will have statistical significance; that the modern tendency to overstatisticize test results seems to be erroneous. It would seem better to treat the raw material with as little statisticizing as possible, with a forced nonstatistical interpretation of the differences; that less weight is to be put on final test scores. Thus mental tests become merely a standardized means of having the subject do something so that the trained examiner may observe his behavior and thus may arrive at a qualitative analytic diagnosis of the individual case.

M. E. GALLAGHER (Pennsylvania)

679. SKERRETT, H. S., Trainability and Emotional Reaction in the Human Infant. *Psychol. Clinic,* 1922, **14**, 106–110.

At what age is the starting point of trainability? With Bob, the hero of this story, it was when he was five months and nine days old that a systematic attempt was made to teach him to hold his own bottle. When he was slightly over six months old, he was holding his bottle throughout every feeding, with real proficiency. Up to the age of six months, Bob exhibited the initial fear of falling and loud noises, rage at being restrained or feeling hunger or pain, and pleasure in being held or talked to. When he was seven months and ten days old, he was given a rose. He grasped it, but when he got a slight whiff of the flower he started to cry violently. It was a fearful, panicky cry. Every time he was shown a rose, there was a very general emotional disturbance. He made no objection to the smell of a large, strong onion. To the smell of vanilla there was a pleasurable reaction.

M. E. GALLAGHER (Pennsylvania)

680. CLARK, W. W., Birth Rate and Native Intelligence. *Psychol. Clinic,* 1922, **14**, 111–115.

It is commonly considered that families of low mentality have more children than those of normal intelligence; *i.e.,* are especially

prolific in reproduction. The data presented in this study of Dr. Clark's show only a very slight tendency for boys of higher intelligence (by implication, parents of higher mentality) to be members of smaller families indicated by a correlation of –0.079 (P. E. 0.037). It would seem to indicate that the usual assumption that persons of low mentality have much larger families is invalid, and that the tendency is practically negligible.

M. E. GALLAGHER (Pennsylvania)

681. WEIR, M. A., Diagnostic Teaching. *Psychol. Clinic,* 1922, **14**, 116–122.

A diagnostic teaching case is described in the report on William, whose predominant defect, found as a result of eight hours of special teaching, was in the association between auditory and written language.

M. E. GALLAGHER (Pennsylvania)

682. HUBBARD, L., BROWN, H. W., DOUGLAS, L. C., Clinical Reports. *Psychol. Clinic,* 1922, **14**, 123–128.

The Post-Meningitic Imbecile, the Imbecile in School, General Physical and Mental Deficiency, Post-Infantile Paralysis, and an Institutional Case are vividly described under Clinical Reports.

M. E. GALLAGHER (Pennsylvania)

683. YOUNG, H. H., Slot Maze A. *Psychol. Clinic,* 1922, **14**, 73–82.

This preliminary article deals with the results obtained by testing 1304 children, ranging in age from four to nine, with a new "fool-proof" test, the Slot Maze A, designed by Dr. Young.

M. E. GALLAGHER (Pennsylvania)

684. POFFENBERGER, A. T., Measures of Intelligence and Character. *J. of Philos.,* 1922, **19**, 261–266.

While intelligence is, beyond doubt, a very important indicator of the amount of intelligence needed for a given occupation, expert opinion makes a plea for the clear measure of character traits as possessed by the individual whose probable success in a given line of work is to be indicated. Certain kinds of work do not demand such a great amount of intelligence; on the other hand, as an optimum of

character, and often it may be found that for certain activities a low degree of intelligence is more likely to be accompanied by character traits that make for success, *i.e.*, those of a scrub-woman, and automatic machine tender.

Available material showing the relation between intelligence and character traits shows that the relations between them are positive, but that it is probably not more than plus .50 which indicates that desirable traits may be found in persons of low degree of intelligence. Since this is the case, it would be best to measure both, and they should be measured at the same time. The layman has difficulty in determining what is and what is not intelligence, and may be confused by the fact that sometimes the "more stupid one is the better he can do a certain job." Thorndike helps in the matter by classifying intelligences as possessed by everyone, *i.e.*, "abstract intelligence, mechanical intelligence, and social intelligence."

Some modification of content, administration, and supplementary scoring might in the Army Alpha test yield measures of neatness, accuracy, etc., giving thus measures of efficiency or competence, and by weighing of the "ingredients" of the total score we might thereby, on the whole, obtain measures for different occupations. This combination of measure of intelligence along with character, when used for vocational purposes, would prevent wasting high grades of intelligence in lines of work where such is not needed, and as well would prevent waste of adequate grades of character when accompanied by lower degree of intelligence. Certainly this will in all probability prevent one of the greatest human and economic wastes. The individual of low intelligence may provide a remedy in part for restlessness due to extreme "specialization and automaticity."

T. R. Garth (Texas)

685. Giese, F., Zur Untersuchung der praktischen Intelligenz. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **59**, 64–121.

Die praktische Intelligenz, d. h. die des Verhältnisses der geistigen Leistungsfähigkeit zu den durch das Leben dem Einzelnen gestellt en Aufgaben, soll an der Hand von "Tests" geprüft werden. So sucht der Verfasser z. B. zu erfassen die Organisationsfähigkeit, und zwar die manuelle Geschichlichkeit, dann konkrete und abstrakte Spekulation; ferner die praktische Kombination (an konkreten Objekten und an abstrakten Inhalten), weiter die praktische Aufmerksamkeit,

und zwar den Zweckmässigkeitsblick die Findigkeit, die Geistesgegenwart, die Menschenkenntnis, endlich die Anpassung (optisch, akustisch, manuell-motorisch und gedanklich). Die Tests sind teilweise sehr geistreich ersonnen oder geschickt wirklichen Vorbildern entnommen.

HAYMANN (Freiburg)

686. HAHN, R., Beiträge zur Psychologie des Vorbeiredens mit besonderer Berücksichtigung des kindlichen Verhaltens. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **59**, 122–167.

In dieser Arbeit handelt es sich nur um "Falschbezeichnen von Bildern" (in einer früheren wurde das "Falschbenennen von Farben" behandelt). Es findet sich ein ganz bestimmter Typ der Fehlleistungen: es handelt sich oft um ein Zurückführen auf vertraute Dinge und zwar auf Grund der Aehnlichkeit des Gesamteindrucks, häufig auch um ein "Sichbegnügen" mit einer Teilauffassung des Bildes.

HAYMANN (Freiburg)

687. MITCHELL, D., Psychological Examination of Pre-School Age Children. *Sch. and Soc.*, 1922, **15**, 561–568.

The writer reports the results of the psychological examinations made by the Association of Consulting Psychologists at the time that the Division of Child Hygiene was making physical examinations of the children entering eight primary schools in New York City, September, 1921. He found wide variability in native capacity. In the distribution of intelligence quotients the greatest number of children ranged between 80–89, which differs from the range of 96–105 which is given by Terman. It was found that the same psychological measurements could be used for the different racial groups. The children were classified into different groups on the basis of their test ages. Moreover, it was suggested that there be used a modified curriculum which would suit the capacities of the various groups. This curriculum should be richer and more diverse for the brighter children and having greater reference to motor skill for the less bright. The purpose of this is to do away with the mental lassitude of the bright child and the habit of failure and loss of confidence of the less bright under the present system.

B. J. JONES (Boston Psychopathic Hospital)

688. Bridges, J. W., The Value of Intelligence Tests in Universities. *Sch. and Soc.*, 1922, **15**, 295–303.

Since the World War much time has been expended on "intelligence tests for college students." It may be considered whether this time has been well spent. According to the present writer, the data point to the conclusion that there is only a low correlation between the rankings on intelligence tests and the rankings in academic achievement. The question arises: Are we testing intelligence? To quote liberally, in the universities we are . . . dealing with a highly selected group, and the selection has been made very largely on the basis of intelligence or intellectual factors. This is no doubt an important reason for the special weakness of intelligence tests in universities. Intelligence tests have and probably always will have their greatest value in the public schools, and in the diagnosis of mental defect. They have somewhat less validity in high schools, and the value of their general use in colleges and universities is here seriously questioned. The writer suggests that in the solution of university problems a real psychological examination as distinguished from a mere intelligence test would be of great value. In the writer's opinion university administrative officers—presidents, principals, deans, heads of departments—should be educated to understand the importance of psychological and psychiatrical examination, just as they now understand and believe in physical examination, and they should be encouraged to establish the practice of referring all problem cases to the psychology or psychiatry department for examination and recommendation. A better arrangement would be to have for this purpose a special bureau upon which psychology, psychiatry, and perhaps other departments of medicine would be represented. This is an object towards which, as psychologists, we can legitimately bend our energies.

B. J. Jones (Boston Psychopathic Hospital)

689. Kirkpatrick, E. A., Intelligence Tests in Massachusetts Normal Schools, *Sch. and Soc.*, 1922, **15**, 55–60.

Reports the results of the Thurstone intelligence tests given to students in all the normal schools of Massachusetts. Repetition of the tests shows a practice gain, but does not greatly change the ranking of the students. Normal students make a higher average score than high school seniors and lower than college freshmen, yet the general make-up of normal and college students with reference to

intelligence is much the same. Students who are poor or medium in intelligence realize their possibilities in educational achievement, but able pupils fall short in a large proportion of cases. The writer strongly recommends the use of intelligence tests in all normal schools.

R. PINTNER (Columbia)

690. JUDD, C. H., The Scientific Technique of Curriculum-Making. *Sch. and Soc.*, 1922, **15**, 1–11.

Scientific measurement has been accepted by the schools and has become more or less an accepted part of routine school work. It has shown much waste and incoördination existing in our schools. School systems are not accomplishing what they thought they were. The time has now come for constructive advice, particularly with reference to curriculum-making. There must be continuous collection of the newer types of intellectual material not now included in the curriculum, and a scrutiny to discover what is available for school use. There must be evolved a technique for putting this material in its proper order so as to fit the child's mental development.

R. PINTNER (Columbia)

691. MEAD, A. R., A Score-Card for Student-Teaching, Placement Bureaus and Follow-Up of Teachers in Service. *Sch. and Soc.*, 1922, **15**, 25–30.

The article describes a rating card for teachers. There are about seventy items, and the scorer is asked to check according as he believes they deserve a rating of A, B, C, D, or E. The items are grouped under such headings as "Results of Teacher's Work," "Teaching Technique," "Community Relations," "Personal Qualities," and the like. Full explanations of all terms used accompany the score card. No results of the use of the score card are recorded. There is appended a bibliography of twenty-three titles on the subject of rating of teachers.

R. PINTNER (Columbia)

692. STELZNER, H., Warenhausdiebstähle der Jugendlichen und ihre Aequivalente. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1920, **62**, 208.

Als während des Krieges und der Revolution in Deutschland Warenhausauslagen nicht mehr so lockten wie früher, trat bei wei-

blichen Jugendlichen an die Stelle der Warenhausdiebstähle vielfach Taschendiebstahl, bei männlichen Mundraub.

HAYMANN (Freiburg)

693. GÖTT, T., Eine wenig bekannte Mitbewegung und Ihr Sinn. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **66**, 93.

Wenn man Kinder auffordert, den Mund zu öffnen, um ihnen in den Rachen sehen zu können, so öffnen sie mit dem Mund auch die Augen und spreizen die Finger der starr nach unten gestreckten Arme. G. erklärt diese an sich schwer verständliche Mitbewegung mit der Annahme,, dass die "gefühlsmässige Vorstellung" des Mundaufmachens die Kinder veranlasse, gleichzeitig auch Augen und Finger zu "öffnen."

HAYMANN (Freiburg)

694. BOSSERT, O., Das Problem der Uebererregbarkeit im frühen Kindesalter. *Zeits. f. d. ges. Neurol. u. Psychiat.*, 1921, **67**, 311.

Es gibt namentlich 2 Typen von übererregbaren Kindern: (1) die gutgenährten, die aus voller Gesundheit heraus ihre Stimmritzenkrämpfe und ihre eklamptischen Anfälle bekommen; (2) die in der Körperentwicklung zurückgebliebenen, bei denen die Uebererregbarkeit vor allem Carpopedalspasmen hervorruft. Myographische Studien erwiesen objektiv diese durch klinische Beobachtung gewonnene Trennung. Prüft man die Muskelerregbarkeit mittels des elektrischen Stroms, so zeigt die 1. Gruppe hohe, spitzwinkelige Kurven, die zweite rundliche Kurven mit breitem Plateau. Die vermutlich zugrunde liegende Kalkarmut ist verschieden verteilt (Muskulatur-Nervensystem).

HAYMANN (Freiburg)

12. MENTAL EVOLUTION

695. HEYDE, H. C. VAN DER, Ueber Lernfähigkeit der Strandkrabbe (*Carcinus maenas*). *Biol. Centralb.*, 1920, **40**, 503–514.

Verf. hat das von Yerkes für Tanzmäuse, von Eldering für Periplaneta, von ihm selbst für Formica sanguinea benuzte "Labyrinth B" verwandt. Es zeigte sich, dass Carcinus hinter den 3 anderen Tieren an Lernfähigkeit zurücksteht; doch ist der Unterschied bei

allen gering. Die Krabben schienen sich vorwiegend kinästhetisch zu orientieren, die Glaswände des Labyrinthes sahen sie nicht. Am schnellsten werden die nahe dem Ziel gemachten Fehler korrigiert. " Trial and error " reicht zur Erklärung des Abschneidens der fehlerhaften Schleifen nicht aus.

ZUR STRASSEN (Frankfurt a/M.)

696. KUTTLER, H., Strongylognathus huberi For. r. alpinus Wr. eine sklavenraubende Ameise. *Biol. Centralbl.,* 1920, **40**, 528–538.

Nachweis, dass Str. selbständige Raubzüge Sklaven unternimmt, Es geschieht nachts, wenn die zu überfallenden Ameisen (Tetramorium) infolge der Kühle träge sind. Die Sklaven begleiten ihre Herren und verhalten sich sogar aktiver als sie. Das Ends ist allemal eine Allianz zwischen dem Str.-Volk und dem Raste der geplünderten Kolonie.

ZUR STRASSEN (Frankfurt a/M.)

697. KLATT, B., Beiträge zur Sexualphysiologie des Schwammspinners. *Biol. Centralbl.,* 1920, **40**, 539–558.

Der normale Instinkt der Eiablage wird nicht durch die Berührung des Penis ausgelöst, sondern durch den taktilen Reiz der beweglichen Samenelemente. Der weg der Reizung geht über das Gehirn.

ZUR STRASSEN (Frankfurt a/M.)

698. SZYMANSKI, I. S., Motorische und sensorielle Tiertypen. *Biol. Centralbl.,* 1920, **40**, 558–562.

Verf. fand die von L. Lange beim Mensohen festgestellten Typen auch bei Ratten, Hühnern, Hunden. Z. B. rennen manche Hühner im Labyrinth sogleich wild los, nehmen irgendeinen Weg. gelangen auch durch starke Ueberproduktion oft überraschend schnell ans Ziel, lernen jedoch wenig hinzu, da sie die Reize der Umgebung kaum beachten. Andere bleiben ruhig sitzen, betrachten alles, ehe sie sich in Bewegung setzen, lernen aber gut und machen den Weg immer schneller. Die Mehrzahl gehört, wie beim Menschen, zu einem mittleren Typus. Auch als Artmerkmal finden sich die Typen: Hund und Katze. Ferner in der Entwickelung: jung mehr motorisch, alt mehr sensoriell.

ZUR STRASSEN (Frankfurt a/M.)

699. Szymanski, I. S., Gibt es ein aussermenschliches Bewusstin? *Biol. Centralbl.*, 1920, **40**, 562–566.

Der einzige Weg, Bewusstsein bei Tieren nachzuweisen, ware: wenn solche (möglichst einfache) Verhaltungsformen, die beim Menchen " eben durch seine Disposition zum bewussten Erleben mitbedingt zu sein scheinen," bei Tieren einwandfrei festgestellt werden könnten. Verf. zeigt, dass Hühner die Aehnlichkeit zwischen einfachen Körpern (Kugel, Pyramide) und ihren in Oelfarbe ausgeführten Flächenabbildungen erkennen: Dieses Erfassen der nicht sinnlich wahrgenommenen, sondern " innerlich erkannten " partiellen Gleichheit beider Gebilde sei ohne allgemeine Disposition zum bewussten Erleben nicht denkbar. Hinweise auf Wolfg. Köhler und Henning.

zur Strassen (Frankfurt a/M.)

700. Buddenbrock, W. von, Der Rhythmus der Schreitbewegungen der Stabheuschrecke Dyxippus. *Biol. Centralbl.*, 1921, **41**, 41–48.

In der normalen Gangart bewegt " Dyxippus," wie alle Insekten, bei jedem Schritte 3 Beine gleichzeitig, und zwar je ein Vorder- und Hinterbein einer Körperseite und ein Mittelbein der andern Seite. Nach Amputation einzelner Beine bewegen sich die übrigen in neuer, aber wiederum zweckmässiger Koordination. Werden z. B. die zwei Mittelbeine amputiert, so geht das Tier nicht etwa " Pass," sondern vierbeinig gekreuzt. Durch weitere Versuche, u. a. auch Durchschneidung von Nerven, ergab sich, dass ein sehr Verwickelter nervöser Regulationsvorgang vorliegt, wobei aber auch mechanische Reizung von Bein zu Bein eine Rolle spielt.

zur Strassen (Frankfurt a/M.)

701. Schmidt, G., Versuche über Stereoverhalten der Oscillarien. *Biol. Centralbl.*, 1921, **41**, 173–187.

Die Oscillarien bedürfen zu ihrer Fortbewegung einer festen Unterlage und schmiegen sich allen Unebenheiten derselbrn innig an. Verf. untersucht, ob Stereotaxis oder Stereotropismus vorhanden sei. Es zeigt sich, dass beide fehlen. Die Anschmiegung an den Untergrund beruht vielmehr darauf, dass das vorderste Fadenende schwingende Bewegungen ausführt und jedesmal, wenn es den Grund berührt, mit seiner Schleimhülle kleben bleibt.

zur Strassen (Frankfurt a/M.)

702. GALANT, S., Reflex und Instinkt bei Tieren. *Biol. Centralbl.*, 1921, **41**, 193–211.

Im Anschluss an frühere Mitteilungen über geköpfte Insekten (Kratzreflex von Carabus auratus) wird berichtet, dass z. B. Wespen ohne Kopf den Geh-, Flug-, Putz-, Kratz-, Stich-, Umkehrreflex besitzen. Formica rufibarbis wird durch leichten Druck auf den kopf für 3 Minuten in Starre versetzt. Bemerkungen über den Kratzreflex des Hundes. Darlegungen über Beziehungen zwischen Reflex, Instinkt, Intelligenz.

ZUR STRASSEN (Frankfurt a/M.)

703. HONIGMANN, H., Zur Biologie der Schildkröten. *Biol. Centralbl.*, 1921, **41**, 241–250.

Gegenüber der Ansicht von Henning, die Oelkugeln in der Retina von Schildkröten befähigten die Tiere zu besonders gutem Fernsehen durch trube Medien, erklärt Verf., dass die Schildkröten eine solche Fähigkeit gar nicht besitzen. Hennings Versuchsergebnisse werden auf Geruchswirkung zurückgeführt. Denn die Schildkröten riechen, was bisher nicht bekannt war, sehr gut, in Luft sowohl wie in Wasser. In einen mit Fischfleisch gefüllten verschnürten Beutel beissen sie eifrig hinein, während ein genau ebenso aussehender mit Sand gefüllter Beutel unbeachtet bleibt. Auch Geschmackssinn wird festgestellt.

ZUR STRASSEN (Frankfurt a/M.)

704. WIEHMEYER, H., Die mitteleuropäischen Beobachtungen von Harpagoxenus sublevis Mayer (früher Tomognathus). *Biol. Centralbl.*, 1921, **41**, 269–278.

Die Angaben von Adlerz über diese Nordische, vom Verf. in Sachsen nachgewiesene Raubameise werden besprochen und erweitert.

ZUR STRASSEN (Frankfurt a/M.)

705. GOETSCH, W., Ungewöhnliche Arten von Nahrungsaufnahme bei Hydren. *Biol. Centralbl.*, 1921, **41**, 414–422.

Wenn Verf. hungernden Hydren zerquetschte Daphnien reichte, so logten sie die Fangharme zurück, öffneten den Mund enorm weit und schoben das Entoderm hervor. In Fleischextraktlösung machen sie es, wie schon Jennings angibt, ebenso. Wurden zerschnittene Hydren mit zerdrückten Daphnien in Berührung gebracht, so quoll

das Entoderm ebenfalls aus der Wunde hervor wobei die einzelnen Zellen mit wasserklaren Pseudopodien nach dem Futter hindrängten. Hydren, die Teile von anderen Exemplaren der gleichen Spezies oder auch ihre eigsnen Tentakel in den Magen aufgenommen hatten, verdauten diese niemals. Offenbar besteht ein die ganze Spezies umfassender Schutzstoff gegen das Verdantwerden.

ZUR STRASSEN (Frankfurt a/M.)

706. GERRETSEN, F. C., Einige Notizen über das Leuchten des javanischen Leuchtkäfers (Luciola vittata Cast.). *Biol. Centralbl.*, 1922, **42**, 1–9.

Das periodische Leuchten kann nicht, wie Verworn angibt, automatisch von einem Centrum aus gestimmt werden, denn die Tiere laufen oft umher, ohne zu leuchten, und leuchten anderseits auf Reiz. Verf. beweist dies, indem er die Käfer mit dem Kopf durch einen grossen Karton steckt: wurde jetzt in 100 cm vom Kolpfe des Tieres eine Glühlampe momentan eingesehaltet, so erlosch das Leuchten fast sofort, um nach einigen Sekunden Ruhe wieder zu beginnen. Lässt man die Lampe brennen, so unterbleibt das Leuchten ebensolang.

ZUR STRASSEN (Frankfurt a/M.)

707. SCHAEFER, I. G., Ueber den Lagereflex-Tonus von Raja clavata. *Biol. Centralbl.*, 1921, **41**, 289–296.

Ein auf den Rücken gelegter, am Umdrehen verhinderter Rochen fällt in Reflextonus. Hierbei sind die am Undrehreflex beteiligten Muskeln kontrahiert, woraus folgt, dass die "tierische Hypnose" nicht auf Ermüdung, sondern auf Erregungsvorgängen beruht. Anfangs erstreckt sich der Tonus auf das Reflexcentrum. Allgemeines über Akinesen.

ZUR STRASSEN (Frankfurt a/M.)

708. MANGOLD, E., Tierische Hypnose bei Echinodermen. *Biol. Centralbl.*, 1921, **41**, 456–458.

Wird Ophioderma mehrere Male auf den Tisch geworfen, to tritt hypertonische Akinese ein. Die Arme werden starr geradeaus gestreckt, Umkehrreflex bleibt aus, etc. Aehnlich Ophioglypha. Hier scheint jedoch auch reflektorische Bewegungslosigkeit ohne Tonussteigerung vorzukommen.

ZUR STRASSEN (Frankfurt a/M.)

709. Rueschkamp, P. E., Wheelers Trophallaxis und Ursprung der Insektenstaaten. *Biol. Centralbl.*, 1921, **41**, 481–494.

Kritisches Referat und Hypothese über den Ursprung der Insektenstaaten, wobei Vererbung von Gewohnheiten als Wurzel der sozialen Instinkte angenommen wird.

zur Strassen (Frankfurt a/M.)

710. Krausse, A., Formica fusca fusca-Königin bei Formica rufa pratensis-Arbeiterinser im künstlichen Nest. *Biol. Centralbl.*, 1921, **41**, 523–527.

Mitteilung von Versuchen: die fusca-Königinnen wurden aufgenommen und legten Eier.

zur Strassen (Frankfurt a/M.)

711. Bierens de Haan, I. A., Phototaktische Bewegungen von Tieren bei doppelter Reizquelle. Versuche an Littorinen und Daphnien. *Biol. Centralbl.*, 1921, **41**, 395–413.

Bohn hatte angegeben, dass negativ phototaktisch gestimmte Littorinen zwischen zwei dunklen Schirmen gleichsam passiv hindurchgezogen werden. Verf. erklärt die Methodik Bohns für fehlerhaft. Bei seinen eigenen Versuchen zeigtsn die Littorinen sich von der Richtung der dunklen Schirme keineswegs so sklavisch abhängig, wie Bohn behauptet, sondern benahmen sich ziemlich willkürlich, wählten aber immer einen beiden der Schirme als Ziel.—In ähnlicher Weise hatte Ewald behauptet, dass Daphnien sich, dem Reize zweier Lichtquellen ausgesetzt, nach dem Kräfteparallelogramm orientierten. Auch dies wird vom Verf. widerlegt: die Daphnien benehmen sich, als wenn sie nur von einer der beiden Lichtquellen gereizt würden. In beiden Fällen liegt weder ein " Tropismus " im Sinne Loebs, noch eine " Trophotaxie " im Sinne Kühns vor.

zur Strassen (Frankfurt a/M.)

712. Herrick, F. H., Homing Powers of the Cat. *Sci. Mon.*, 1922, **14**, 525–539.

Experiments were made with a mother cat. She was taken in a gunny sack and once under complete anesthesia by irregular routes to release points at distances of one to three miles in different directions from home. She was able to return in eight to seventy-eight hours. Observations of her movements for twenty or less minutes after release found her to strike at once a definite orientation toward

home and to start upon a straight line thereto, except when forced aside by dogs, humans, or inviting cover. No "backtracking" was shown. It is conjectured that (1) the cat seems to have a direction-constant; (2) this does not depend upon memory nor upon vision, hearing, nor smell; (3) it may depend upon the kinesthetic sense, by which compensatory movements can be made to deviations in the position of the body.

J. F. DASHIELL (North Carolina)

713. MAGNUS, R., Körperstellung und Labyrinthreflexe beim Affen. *Arch. f. d. ges. Physiol.*, 1922, **193**, 396–449.

Magnus findet in Bezug auf die Labyrinth-und Körperstellungsreflexe principiell beim Affen dasselbe Verhalten wie bei Kaninchen, Hund und Meerschweinchen. Es lassen sich beim Affen nachweisen: die Reflexe auf Drehungen und Progressivbewegungen (Bogengangsreflexe nach Magnus) und die Lagereflexe, die tonischen Hals- und Otolithenreflexe und die vestibulären und optischen Stellreflexe auf Kopf und Körper. Mit Ausnahme der optischen Stellreflexe, die über das Grosshirn laufen, sind alle diese Reflexe auch beim grosshirnlosen Affen (Thalamustier) vorhanden.

STEINHAUSEN (Frankfurt a/M.)

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THE

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PERCEPTION: AN INTRODUCTION TO THE *GESTALT-THEORIE.*

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When it was suggested to me that I should write a general critical review of the work recently carried on in the field of perception, I saw an opportunity of introducing to American readers a movement in psychological thought which has developed in Germany during the last ten years. In 1912 Wertheimer stated for the first time the principles of a *Gestalt-Theorie* which has served as the starting point of a small number of German psychologists. Wherever this new method of thinking and working has come in touch with concrete problems, it has not only showed its efficiency, but has also brought to light startling and important facts, which, without the guidance of this theory, could not so easily have been discovered.

The *Gestalt-Theorie* is more than a theory of perception: it is even more than a mere psychological theory. Yet it originated in a study of perception, and the investigation of this topic has furnished the better part of the experimental work which has been done. Consequently, an introduction to this new theory can best be gained, perhaps, by a consideration of the facts of perception.

Since the new point of view has not yet won its way in Germany, it is but fair to state at the outset that the majority of German psychologists still stands aloof. However, much of the work done by other investigators contains results that find a place within the scope of our theory. Accordingly I shall refer to these results as well as to those secured by the *Gestalt*-psychologists proper; for I wish to demonstrate the comprehensiveness of our theory by showing how readily it embraces a number of facts hitherto but imperfectly explained. For the same reason I shall occasionally go farther

back and refer to older investigations. On the other hand, I cannot hope to give a complete survey of the work on perception, and I shall therefore select my facts with reference to my primary purpose.

Since my chief aim is to invite a consideration of the new theory, I shall try first of all to make my American readers understand what the theory purports to be. So far there exists no general presentation of the theory which marshals all the facts upon which it rests; indeed, the general field of psychology has not, as yet, been treated from this point of view. For this reason the understanding of the theory has met with serious difficulties, and numerous misunderstandings have occasioned a great deal of the disapprobation which the theory has met. And yet, a theory which has admittedly inspired so many successful investigations may surely claim the right to be at least correctly understood.

My plan in detail is the following: After giving a short sketch of the chief concepts of current psychology as they present themselves to the mind of a *Gestalt*-psychologist, I shall introduce the newer concepts by demonstrating how appropriate they are in the solution of a very old psychological problem. I shall then proceed by developing a fundamental distinction made by the new theory which is quite contrary to the traditional view, and I shall also show the wide application of this distinction. This is all I shall attempt in this paper. In a second one I shall hope to be able to review the rest of the experimental evidence in support of the theory which has been gained in the various fields of perception, such as movement, form, etc. The reader, therefore, will have the complete case before him only after reading the second paper. I have preferred to write the essay in English in order to avoid the misunderstandings which always result from translation; and Professor Ogden has kindly undertaken to correct my manuscript.

When I speak of perception in the following essay, I do not mean a specific psychical function; all I wish to denote by this term is the realm of experiences which are not merely "imagined," "represented," or "thought of." Thus, I would call the desk at which I am now writing a perception, likewise the flavor of the tobacco I am now inhaling from my pipe, or the noise of the traffic in the street below my window. That is to say, I wish to use the term perception in a way that will exclude all theoretical prejudice; for it is my aim to propose a theory of these everyday perceptions which has been developed in Germany during the last ten years, and

to contrast this theory with the traditional views of psychology. With this purpose in mind, I need a term that is quite neutral. In the current textbooks of psychology the term perception is used in a more specific sense, being opposed to sensation, as a more complex process. Here, indeed, is the clue to all the existing theories of perception which I shall consider in this introductory section, together with a glance at the fundamental principles of traditional psychology. Thus I find three concepts, involving three principles of psychological theory, in every current psychological system. In some systems these are the only fundamental concepts, while in others they are supplemented by additional conceptions; but for a long time the adequacy of these three has been beyond dispute. The three concepts to which I refer are those of *sensation, association,* and *attention.* I shall formulate the theoretical principles based upon these concepts and indicate their import in a radical manner so as to lay bare the methods of thinking which have been employed in their use. I am fully aware, of course, that most, if not all, the writers on this subject have tried to modify the assertions which I am about to make; but I maintain, nevertheless, that in working out concrete problems these principles have been employed in the manner in which I shall state them.

I

Sensation: All present or existential consciousness consists of a finite number of real, separable (though not necessarily separate) elements, each element corresponding to a definite stimulus[1] or to a special memory-residuum (see below). Since a conscious unit is thus taken to be a bundle of such elements, Wertheimer, in a recent paper on the foundations of our new theory, has introduced the name "bundle-hypothesis" for this conception (65). These elements, or rather, some of them, are the sensations,[2] and it is the first task of psychology to find out their number and their properties.

The elements, once aroused in the form of sensations, may also be experienced in the form of images. The images are also accepted as elements or atoms of psychological textures and are distinguishable from sensations by certain characteristic properties. They are,

[1] The exceptions to this universal rule occasioned by factors such as fatigue, practice, etc., do not affect the general interpretation and may here be neglected.

[2] We shall set aside the concept of feeling, though in many systems feelings are taken to be specific elements just as simple as sensations.

however, very largely a dependent class, since every image presupposes a corresponding sensation. Thus the concept of image, though not identical with that of sensation, rests upon the same principle, namely, the bundle-hypothesis.

In accordance with the method by which sensations have been investigated, it has been necessary to refer to the stimulus-side in defining the principle which underlies this concept. More explicitly, this relation of the sensation to its stimulus is expressed by a generally accepted rule, termed by Köhler the "constancy-hypothesis" (34); that the sensation is a direct and definite function of the stimulus. Given a certain stimulus and a normal sense-organ, we know what sensation the subject must have, or rather, we know its intensity and quality, while its "clearness" or its "degree of consciousness" is dependent upon still another factor, namely, *attention.*

What the stimulus is to the sensation, the residuum is to the image. Since each separate sensation-element leaves behind it a separate residuum, we have a vast number of these residua in our memory, each of which may be separately aroused, thus providing a certain independence of the original arrangement in which the sensations were experienced. This leads to the theory of the "association mixtures" (*associative Mischwirkungen*) propounded by G. E. Müller (44) and carried to the extreme in a paper by Henning (14).

2. Association: Even under our first heading we have met with the concept of memory. According to current teaching, the chief working principle of memory is association, although the purest of associationists recognize that it is not the only principle. It may suffice to point out in this connection that Rosa Heine (12) concludes from experiments performed in G. E. Müller's laboratory, that recognition is not based upon association; for she failed to detect in recognition any trace of that retroactive inhibition which is so powerful a factor in all associative learning. Likewise, Müller himself, relying upon experiments by L. Schlüter (54) acknowledges the possibility of reproduction by similarity. Yet, despite all this, association holds its position as the primary factor governing the coming and the going of our ideas, and the law of association is based upon the sensation-image concept. Our train of thought having been broken up into separate elements, the question is asked by what law does one element cause the appearance of another, and

the answer is, association, the tie that forms between each element and all those other elements with which it has ever been in contiguity. As Wertheimer (65) again has pointed out, the core of this theory is this, that the necessary and sufficient cause for the formation and operation of an association is an original existential connection—the mere coexistence of *a* and *b* gives to each a tendency to reproduce the other. Meaning, far from being regarded as one of the conditions of association, is explained by the working of associations, which in themselves are meaningless.

Another feature of this theory is its statistical nature. At every moment, endless associations are working, reinforcing and inhibiting each other.[3] Since we can never have a complete survey of all the effective forces, it is impossible in any single case to make accurate prediction. As the special laws of association can be discovered by statistical methods only, so our predictions can be only statistical.

3. Attention: It is a recognized fact, that, clear and simple as association and sensation appear to be, there is a good deal of obscurity about the concept of attention.[4] And yet, wherever there is an effect that cannot be explained by sensation or association, there attention appears upon the stage. In more complex systems attention is the makeshift, or the scapegoat, if you will, which always interferes with the working out of these other principles. If the expected sensation does not follow when its appropriate stimulus is applied, attention to other contents must have caused it to pass unnoticed, or if a sensation does not properly correspond to the stimulus applied, the attention must have been inadequate, thus leading us to make a false judgment. We meet with like instances over and over again which justify the following general statement, that attention must be added as a separate factor which not only influences the texture and the course of our conscious processes, but is also likely to be influenced by them.

Modern psychology has endeavored to give a physiological foundation to its psychological conceptions. Let us therefore glance at the physiological side of these three principles. The substratum of sensation (and image) is supposed to be the arousal of a separate and circumscribed area of the cortex, while the substratum for association is the neural connection established between such areas.

[3] That the facts of reinforcement and inhibition are far from fitting into the theory can be mentioned only incidentally. The reader is referred to the work of Shepard and Fogelsonger (58), and to that of Fringa (8).

[4] Compare Titchener's recent discussion (62).

Again attention holds an ambiguous position, for some see its essence as a facilitation and some as an inhibition of the nervous processes. Without going more into detail, let us examine the nature of this psycho-physical correspondence. Methodologically the physiological and the psychological aspects of these three principles are in perfect harmony; the cortex has been divided into areas, the immediate experience has been analyzed into elements, and connections are assumed to exist between brain areas as between the elements of consciousness. Furthermore, the nervous processes may be altered functionally and their corresponding psychological elements are subject to the functional factor of attention. Evidently the psychological and the physiological are interdependent, and are not sensation, association, and attention, factual? Do not cortical areas exist, and likewise nervous tracts, and the facilitation and inhibition of excitations? Certainly facts exist which have been interpreted in these ways, but we believe it can be proved that this interpretation is insufficient in the face of other and more comprehensive facts. Furthermore, we maintain that the insufficiency of the older theory cannot be remedied by supplementing the three principles, but that these must be sacrificed and replaced by other principles. It is not a discovery of the *Gestalt-psychologie* that these three concepts are inadequate to cover the abundance of mental phenomena, for many others have held the same opinion, and some have even begun experimental work with this in mind. I need but mention v. Ehrenfels and the Meinong school as one instance, Külpe and the Würzburg school as another. But they all left the traditional concepts intact, and while trying to overcome the difficulties by the expedient of adding new concepts, they could not check the tendency involved in these new concepts to modify the old ones. I must, however, warn the reader not to confound the old term of *Gestalt-Qualität* with the term *Gestalt* as it is employed in the new theory. It was to avoid this very confusion that Wertheimer in his first paper avoided the term (64) and introduced a totally neutral expression for the perception of movement—the *phi-phenomenon*.

Just a line at this point upon certain recent tendencies in American psychology. Behaviorism, excluding as it does all forms of consciousness from its realm, strictly speaking denies the use of these three principles altogether. Therefore we do not find the terms attention and sensation in the behaviorist's writings, and even association has disappeared from the explanation in the sense of a

tie that can be formed as an original act. And yet, as I have shown in a paper which discusses the fundamental differences between Wertheimer's theory and that of Meinong and Benussi (26), despite the restriction in his use of terms, the outfit of the Behaviorist is essentially the same as that of the traditional psychologist. He says "reaction" where the latter said "sensation," and in so doing includes the effector side of the process, but apart from this he builds his system in exactly the same manner, joining reflex arcs to reflex arcs entirely in accordance with the method of the "bundle-hypothesis."

However, I find a radical abandonment of this hypothesis in Rahn's monograph (52) and also in a recent paper by Ogden (48). With both of these I can in large measure agree, and both of these writers, it seems to me, could readily assimilate the fundamental working principle of the *Gestalt-Psychologie*.

II

In order to demonstrate the clash of the old and new methods of thinking, I have chosen a very elementary example, which I have discussed in a recent paper (30). No field of psychological research, perhaps, has been better clarified than that pertaining to the differential threshold and Weber's Law. Yet when we come to the theory, we are far from finding unanimity among psychologists. I need but recall to the reader's mind Stumpf's famous old argument (60) which, abbreviated, may be stated in the following form: It is always possible to produce three sensations, a, b, and c, so that a and b are judged equal, likewise b and c, whereas a and c are judged to be different (either $a > b$ or $b > a$). Stumpf concludes that in reality $a \ddagger b$ and $b \ddagger c$, that is to say, our judgments of equality were based upon our incapacity to *notice* very small yet actual differences, the consequence of this conclusion being that the differential threshold as measured by our methods appears to be a fact, not of sensation, but of our capacity of perceiving. Others, such as Cornelius, Ebbinghaus, Titchener, have not been so ready to abandon the sensationalistic interpretation. The explanations of Ebbinghaus and Titchener may be summarized in the word "friction." The nervous excitation corresponding to sensation *a* has a certain amount of inertia, so that a second but slightly different stimulus is incapable of arousing a slightly different sensation,

but only the first sensation *a*. If, however, we apply a stimulus that is considerably different, the inertia will be overcome, and a different sensation result. This, at the first flush, would appear to be a sufficient explanation, but for the following result: When we apply two slightly different stimuli a > b a great number of times, we get four different kinds of judgment: (1) a equals b; (2) a > b; (3) a < b; (4) uncertain. Now the "friction" theory, although it covers 2 and 4, does not explain case 3.

Two attempts have been made to overcome this difficulty. The first is G. E. Müller's theory of the "chance-error" (43) which maintains that the final result of a stimulus is never the effect of this stimulus alone, for there are external or internal processes always at work to modify either the sensation itself or our apprehension of it. (In so far, Müller's theory is in harmony with Stumpf's unnoticed sensations.) Therefore it may well happen that though a > b, $a-\delta < b+\delta$. According to Müller, one of the causes of these chance processes is attention.

To understand the second attempt, made by Cornelius (4), we must analyze the "friction" and the "chance-error" hypotheses in their interpretation of Stumpf's paradox. Stumpf introduced his "function of perceiving" in order to avoid a contradiction. If a=b and b=c, it is contradictory that a ‡ c. However, the whole argument rests upon a tacit assumption. We have three different stimuli in a> b> c. According to the classic theories a sensation corresponds to each of these; let us call them *a, b, c*. Now in reality we have also three different sets of experiments (or groups of experiments): *a* compared with *b*, *b* compared with *c*, and *a* with *c*. Stumpf's contradiction arises only if a sensation is regarded as being a function of its stimulus alone, that is, if the constancy hypothesis holds in its strictest form. If, however, a sensation is also a function of the general experimental setting, then the contradiction disappears. Should stimulus a correspond in accordance with the special experiment to one of the sensations a_1, a_3, stimulus b to b_1, b_2, and stimulus c to c_2, c_3, then as a result of our experiments we might have the following non-contradictory facts: $a_1=b_1$, $b_2=c_2$, $a_3> c_3$. Long ago this was pointed out by Cornelius and has been admitted, since, by Stumpf, who nevertheless maintains his position, *viz:* $a_1=a_3$, $b_1=b_2$, and $c_2=c_3$, because it seemed to him ever so much simpler than any other assumption.[5] Yet the "friction"

[5] Full quotations in (30).

and the "chance-error" theories both abandon Stumpf's position. Friction requires that c_2 at least must be different from c_3, and the chance-error theory, insofar as it touches sensation and not apprehension merely, allows variability to all sensations. But both these theories strive to remain as close as possible to the constancy-hypothesis, the latter even more so than the former; for according to it, the true stimulus always evokes the same sensation although additional processes may increase or decrease its effect.

Now Cornelius excludes the constancy-hypothesis from his theory. He assumes that to a single definite stimulus there corresponds, not a single definite sensation, but one of a number of several different ones (he denies also the continuity of the sensation-series). His theory therefore implies the general rule that sensation is not a function of the stimulus alone, and again it is attention that determines which of the many possible sensations will be aroused.

We have therefore a number of different explanations, which, however, apart from the rôle ascribed to attention, all possess one common element: namely, they all start from the relation between a single stimulus and a single sensation, though this relation is modified by the friction-theory and still more by Cornelius. This modification, however, involves an addition of new factors, and accordingly we get a sum of different effects instead of a single effect.

Shall we then say that all in all the problem has been solved; that the minor differences of opinion are negligible? My answer is no, for with no one of the existing theories can we predict a single case. Therefore, if we accept them, we must either exclude single predictions altogether from our programme—as chance can be only statistically predicted—or we must await a discovery of the laws of attention, the outlook for which is not very hopeful when we consider how ill-defined the concept of attention now is.

Let us, therefore, try another method, and, returning to the simplest facts, without prepossession, look the data underlying all these theories in the face. What is my experience when I say this gray is lighter than that, this line longer, or this sound louder, than that? The old theories assume without question that we are dealing with gray *a* and gray *b*, line *a* and line *b*, sound *a* and sound *b*. Whenever the bare existence of two sensations have seemed insufficient to explain a judgment of comparison, psychologists have searched, and not in vain, for other elements. Schumann (56) long ago attacked this problem, and was able to supplement the descrip-

tive side of comparison, but he could only find what he was seeking, and it was in this way that he discovered the accessory impressions (*Nebeneindrücke*)—those transitional sensations (*Übergangsempfindungen*) which have not yet ceased to play an important part in psychological theory. Other authors have turned to the *relations* as separate autonomous or dependent (*unselbständig*) elements,[6] and these again have been either rejected or reduced by the analysis of other psychologists. Thus, current teaching has reached no agreement concerning the descriptive side of this problem.

Let us, therefore, turn to the experience itself. Upon a black cloth two squares of gray cardboard lie side by side. I am to judge whether or not they are of equal grayness. What is my experience? I can think of four different possibilities. (1) I see on a black surface one homogeneous gray oblong with a thin division line which organizes this oblong into two squares. For simplicity's sake we shall neglect this line, although it has varying aspects. (2) I see a pair of "brightness steps" ascending from left to right. This is a very definite experience with well-definable properties. Just as in a real staircase the steps may have different heights, so my experience may be that of a steep or a moderate ascent. It may be well-balanced or ill-balanced, the latter *e.g.* when there is a middle gray on the left and a radiant white on the right. And it has two *steps*. This must be rightly understood. If I say a real stair has two steps, I do not say there is one plank below and another plank above. I may find out later that the steps are planks, but originally I saw no planks, but only steps. Just so in my brightness steps: I see the darker left and the brighter right not as separate and independent pieces of color, but as steps, and as steps ascending from left to right. What does this mean? A plank is a plank anywhere and in any position; a step is a step only in its proper position in a scale. Again, a sensation of gray, for traditional psychology, may be a sensation of gray anywhere, but a gray step is a gray step only in a series of brightnesses. Scientific thought, concerned as it is with real things, has centered around concepts like "plank" and has neglected concepts like "step."[7] Consequently the assertion has become true without qualification that a "step" is a "plank". Psychology, although it is

[6] A full discussion of this problem of relation may be found in the papers by Gelb (10) and Höfler (16).

[7] The reason for this trend in the formation of our concepts is discussed by Köhler (38, p. 48f).

concerned with experiences, has invariably taken over this mode of procedure. But since the inadequacy occasioned by the neglect of the step-concept is much more conspicuous in psychology than it is in physics, it is our science that first supplied the impulse to reconsider the case. And when we do reconsider, we see at once that the assertion "a sensation of gray is a sensation of gray anywhere" loses all meaning,[8] and that the assertion that a real step is a plank is true only with certain qualifications.

But our previous description must be still further supplemented, or, rather, amplified; for, speaking of "steps" I mean not only two different levels, but the rise itself, the upward trend and direction, which is not a separate, flighty, transitional sensation, but a central property of this whole undivided experience. Undivided does not mean uniform, for an undivided experience may be articulated and it may involve an immense richness of detail, yet this detail does not make of it a sum of many experiences. The direction upward or downward under certain conditions, *e.g.*, under brief exposure, may be the chief moment of the total experience; in extreme cases, this direction may be present and nothing else, the plank-character of the steps having entirely vanished. In this connection I may refer to a result of Seifert's. He worked with tachistoscopically exposed figures that were composed either of full lines or of isolated dots. But this made no difference in the appearance of the total figure, and although Seifert accepts the distinction of a fundamental and a superstructure, he is constrained to acknowledge an "ungratefulness" towards the elements (57, p. 74). To return to our own case, we may say that the experience described as *direction* may be entirely dynamic, and that it is always partially so.[9]

Let us now return to the remaining possible experiences which can arise in the comparison of two gray squares. (3) I see a pair of brightness-steps with the reverse direction. (4) I see neither the uniform oblong nor the steps, but something indefinite, vague, not tending towards uniformity, nor towards an ascending or descending step, since it never quite consolidates itself.

It is evident what judgments will follow from each of these experiences: (1) Judgment of equality; (2) left darker (or right

[8] Rahn has developed the same view from an implicit criticism of current teaching (52).

[9] Wertheimer has introduced the distinction of static and dynamic phenomena (64, p. 227), recognizing that the latter are no less real than the former.

brighter)[10]; (3) left brighter (right darker), and (4) uncertain. Thus the four types of judgment which we met previously are reduced to four different experiences.

While in the former passage we made the four types correspond to the same pair of (subliminally different) stimuli, we shall now consider cases in which typically different pairs of stimuli provoke these different judgments. What, then, follows theoretically from our pure description? We find that our description *explains* the comparison. Comparison is no longer a new act supervening upon the given sensations. The question how the two sensations can be compared no longer exists, because the two sensations themselves do not exist. What we find is an undivided, articulated whole. Let us call these wholes "structures," and we can then assert that an unprejudiced description finds such structures in the cases underlying all psycho-physical experiments, but never any separate sensations.

Our theory finds confirmation in a crucial experiment, which shows, moreover, that these simple structures, far from being a peculiarity of the human species, are a very primitive form of reaction. As the question is put by Köhler (36), if an animal is confronted with two stimuli and is trained to react positively to the one and negatively to the other, what has it learned? The traditional theory would reply: the animal has formed a connection between the one sensation corresponding to the first stimulus and the positive reaction and likewise between the other sensation and the negative reaction; our theory, however, would say that the animal has learned to react to a certain structure. Köhler then introduced an experimental variation to solve the dilemma as to which explanation is the more apt. His method was as follows: b and c, one lighter, the other darker, were placed before the animal, their spatial arrangement being varied. From the one, say b, food could be taken, but not from the other. The training was continued until the animal, in a fixed number of trials, invariably chose the positive b. Then this pair of stimuli was replaced by another pair a and b, a being lighter than b. According to the old theory the behavior of the animal should be as follows: Since it has to choose between the well-known and positive

[10] These two judgments are psychologically different, and to each there corresponds a different stepwise phenomenon, as a rise to the right, or a fall to the left. We have, for simplicity's sake, neglected this difference, and shall continue to do so in what follows. The reader can easily supplement the discussion in order to make it cover this distinction also.

b, connected by previous training with a positive movement, and a new and neutral a with which it has formed no connection at all, we should expect that in the majority of cases b would be chosen. From our theory, however, we should make a contrary prediction. Having learned to react positively to the higher step of a brightness-scale, the animal will do the same thing when confronted with a new pair, and choose a. The experiments were performed with fowls, chimpanzees and a three-year-old child. In the vast majority of cases gray a was chosen, while further variations in the experiment indicated the reason for every b reaction. In exceptional cases the absolute factor, b, was dominant, though even then it could not be regarded a sensation in the traditional meaning of the term, but only as a structure of a kind to be discussed in the next section. As compared with the structural component the absolute factor as a cue to reaction has a very weak hold upon the memory, and with an increase of the time-interval between the training and the critical experiments, the number of a-choices was found to increase. The same problem was attacked with different sizes of objects and yielded the same results. The experiments were very carefully executed, all possible errors being excluded, while certain objections, which were nevertheless raised, have been set aside by subsequent tests (35, 37).

Though the results of these experiments are unimpeachable, psychologists have not all been ready to accept Köhler's theory. Jaensch, for instance, who reported upon similar experiments with fowls two years after Köhler's publication (21), turns to Schumann's transitional sensations for an explanation of his results, as do Bühler (2) and Lindworsky (41) in their criticism of Köhler's experiments. I have shown at some length in my book on mental development (33) that this attempt at an explanation is quite unsatisfactory, but here I must pass the matter over. Structures, then, are very elementary reactions, which phenomenally are not composed of constituent elements, their members being what they are by virtue of their "member-character," their place in the whole; their essential nature being derived from the whole whose members they are.

Here the argument may be anticipated that, in the analysis, parts must determine the whole; you lay the lighter gray at the left and you have a different brightness gradation than when you lay it at the right! But what does this argument really prove? Remember, you must not substitute your sensations for your stimuli. If you are

careful not to do this, your argument must be that the arrangement of the single stimuli determines the whole structure. But you have not proved that the part phenomena have determined the whole phenomenon; for it you react at all by way of a stepwise phenomenon its nature must depend, of course, upon the stimuli which provoked the reaction. Very good, you may say, but what is the advantage of this new way of describing simple experiences? It seems on the face of it so much more complicated, so much less systematic, than the old way. This, indeed, is a fundamental question. But it cannot be answered by argument,—only by facts. It must be shown that in all fields as well as in the field of choice-training (*Wahldressuren*) this new description explains the facts of experience more easily and better than they can be explained by the traditional view.

Let us, therefore, turn back to our threshold-problem, and to Stumpf's paradox which is now easily solved, while the solution leads us to two important laws of structure. With the two subliminally different stimuli, a and b, what will be the O.'s reaction? Most probably experience 1 or 4; which of these two will depend upon circumstances. If the observer is not acting as the subject of a psychological experiment and is neither suspicious of deception nor otherwise prepared to look for the finest shades of difference, he will react with experience 1; which means that the structure corresponding to two very slightly different stimuli will be one of uniformity. Next you present the supraliminally different stimuli a and c and he will react with experience 2 or 3, as the case may be, that is, he will experience a true stepwise phenomenon. Mathematically, a plane surface can be defined as an aggregate of steps of infinitely small gradation; in mathematics, therefore, we can have a continual transition from steps to plane-surface. But not so in our experience, for here a plane is never a step nor is there any mediation between the two—our experience 4 being neither a step nor a plane but a very labile and indefinite experience. This means that if we neglect for the moment experience 4, we shall have either one of two totally distinct experiences, each of which is a "good" structure. A real ladder with steps one mm. high would not be a good ladder, and, excepting under artificial conditions, such scales do not as a rule exist in our experience nor in the real world either. If, on the other hand, the difference between two stimuli is too great to permit a plane-experience, then we shall have a good stepwise-phenomenon; loosely expressed the experienced difference is exag-

gerated as compared with the stimulus-difference, and this can be proved wherever we have organs that are adapted to reproduce the stimuli.

We can sum up these facts in two special laws of structure: the law of leveling or assimilation, and the law of emphasis. Later on we shall see that these are both special cases of a more general law.

From these two laws we can infer that the "goodness" of the scale has also a maximum or upper limit. Therefore, with an increasing stimulus-difference the step-height-experience will become less and less emphasized until an indifference point is reached, where the objective and the phenomenal difference coincide. At this point the emphasis will be replaced by an assimilative leveling, since the phenomenal difference has become less than the real one. If in a real scale we raise the height of the steps more and more we come at length to the point where we no longer have a scale. Two planks at levels ten meters apart are no longer two steps, and the same thing may happen on the phenomenal side. From the chirping of a cricket to the thundering of a sixteen-inch gun there is no scale, for they cannot be compared in the same sense in which we compare two strokes of a hammer.

To complete our survey by answering some other questions, let us turn to *attention*. Attention influences the differential limen which is lowered by a high and raised by a low degree of attention. What does this mean? (1) We see that assimilation is a less developed reaction than emphasis which demands special conditions and a special readiness on the part of the reacting organism. Accordingly, fatigue raises the threshold and reduces the efficiency of the organism. (2) What is it that a high degree of attention really does in such cases? I mentioned above that, under normal conditions, where we are not called upon to make comparisons, our reaction to subliminally different stimuli will be that of equality, whereas in psychophysical experiments equality-judgments are very rare, being replaced by judgments of uncertainty, or even those of "greater," "smaller." So Fernberger (7) reports of a subject, who, in a series of twelve hundred judgments, did not judge a single pair to be equal. How is this difference of behavior explained? We may describe the facts by stating that judgments of equality or "level-experiences" which are descriptively clear are interfered with by experimental conditions, since these conditions always favor some sort of emphasis. We must therefore endeavor to find out the specific character of the

experimental conditions. The O. has the task of comparing and judging, *i. e.*, of asserting a relation. So far we have not distinguished between the relational and the structural consciousness. This was in the interest of a simplification which must now be corrected to some extent. A pure stepwise phenomenon would lead us to a judgment of "crescendo" or "diminuendo," which, in accordance with the experience will refer to an undivided whole. The judgment "A is greater than B" presupposes a somewhat different experience, for the two steps of the scale are more prominent, more independent; they are not only steps in the scale but also its limiting platforms. Somehow, they stand apart and a greater "tension" between these two members of the whole is a consequence; a tension which does not exist at all in an assimilative phenomenon of the level-type. This, as Köhler (36) has pointed out, is, grossly speaking, our comparing experience. A comparing attitude in itself will therefore tend to separate the two members by producing a tension, which decreases the chance that a phenomenon of the level-type will occur. This explains the preponderance of judgments of uncertainty over those of equality in psychological experiments.

But the experimental attitude is often still more specialized. Even if we include judgments of equality and uncertainty under the same head, they may be remarkably rare. Fernberger (7) has clearly pointed out the reason for this in the subject's attitude which makes him tend toward a specific judgment of "greater or smaller." In the terms of our theory, the instruction facilitates the stepwise and impedes the assimilative phenomena. This can be experimentally proved, and Fernberger has demonstrated how one of Brown's experiments furnishes this proof. Brown impressed upon his subject that he ought to be able to find a difference, *i.e.*, he emphasized the stepwise attitude, and the result was that practically no equality-judgments were made in a long series of experiments. Fernberger himself arranged the following experiment with lifted weights: One group of seven subjects was given the customary instruction which presumably facilitates the stepwise phenomenon, while another group of seven received different instructions in which the three categories "greater," "smaller," and "equal" received the same value. Fernberger gives no tables to show the frequency of these judgments, nor does he differentiate between equality- and uncertainty-judgments, which for our present purpose would have been very advantageous, but he calculates the intervals of uncertainty and

finds that "the interval of uncertainty for group two is considerably more than half as large again as the first group" (page 541).

I may in this connection refer also to Washburn's experiments upon the effect of verbal suggestion in tactual space perception (63). She stimulated twice successively the same region of the volar side of the O.'s wrist with rubber-tipped compass points which were always 15 mm. apart, the O. being instructed to compare the distance between the two points in two successive contacts. In one group of experiments the O. was told the distance would always be smaller or greater, while in a second group the possibility of equality was also included. The results show a marked rise in the number of equality judgments in the second group over the first. Out of eighty judgments only five were of equality in the first group, while there were twenty such in the second.

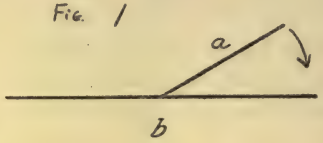
What can we make of these facts? They show that the organism's structural reaction to a pair of stimuli depends upon its attitude. If we generalize from all the data the attitude may be such as to favor either a stepwise or an assimilative structure (each to the detriment of the other), or it may be indifferently advantageous to either one. From a consideration of the stepwise attitude we can now draw the following conclusions: before the subject is confronted with the stimulus, the structure that eventually will ensue must be prepared for by a mental attitude, and this attitude consists mainly in a readiness to carry out a certain structural process. "Attitude" has now become a well-defined term as distinguished from "attention." It means that in entering a given situation the organism has in readiness certain modes of response, these modes being themselves what we have called "structures." Having such a process in readiness may be a mere nuisance, and it may not help the final response to the stimulus at all—as when I am prepared for an ascending scale and receive stimuli that determine a descending one—but the attitude may also be very effective. If a structural process is thus adequately prepared for, it may come to its full effect under conditions which of themselves would have provoked a different structural process. This is a very important law, embracing as it does many of the facts imperfectly formulated by the ancient law of association. Take again the ascending scale attitude, with reference to a pair of subliminally different stimuli $a > b$. By themselves, these would provoke a structure of the level-type; now, however, they give rise to the ascending-scale phenomenon, $a < b$. In this way

the typically false judgments are explained, or, at least, all those that cannot be explained by the absolute impression (*absoluter Eindruck*).

Thus we see that all chance means is that our customary experimental conditions leave room for an uncontrollable change of attitude inasmuch as they do not determine the status of the reacting organism. It is therefore an experimental task of the highest importance to fix the conditions so that they will also govern these attitudes.

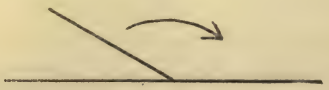
I owe the reader a proof of this general law, and I shall give it by a reference to two experiments of Wertheimer (64) which I have elsewhere considered from this point of view (31). In the tachistoscope Wertheimer exposes in succession, with a short interval between them, the two lines, a and b, of Figure 1.

Fig. 1



The O. sees one line turning in the direction of the arrow. This experiment is repeated several times and then the position of line a is gradually changed, the angle between a and the right half of b becoming less and less acute until it is a right angle, and finally a more and more obtuse angles; let the direction of the turning movement remain constant, as indicated in the second figure.

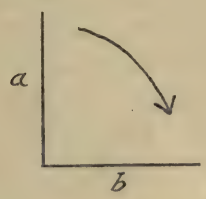
Fig. 2



Had the experiment been begun with the last pattern first, then, of course, the O. would have seen the opposite movement. The effect is always produced by the O.'s attitude, and depends upon the strength of the original movement-structure. Again, expose a,b in the pattern Figure 3, and repeat it a great number of times. Then suddenly remove a so that b alone is exposed. What will the O. see? b resting in its true position? Not at all! The O. sees a line moving in the same direction as before only over a smaller

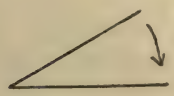
angle, say like Figure 4, and if you repeat the exposure of b alone, at short intervals, this movement may persist several times, though each time the angle grows smaller. Now a single line like b exposed under no specific movement attitude will, of course, give rise to no experience of movement at all, yet in our last experiment the readiness of the movement-structure process is such that it can be

Fig. 3



touched off by a totally inadequate stimulus. This demonstrates the reality of structural preparations or anticipations. We find the same in cases of perseveration[11] and of suggestion. A striking example of the latter is found in the experiments of Edwards (5). Working in different sense-realms he employed the following method of experimentation: a stimulus was given and then gradually changed in some definite direction; the O. had to announce when he noticed the change, but in the suggestion-experiments he was always given a false direction. So when a gray disc was darkened,

Fig. 4



he was instructed to give notice of the first brightening. These suggestions were effective in a surprising number of cases, and the results are fully explained by our hypothesis.

With this concept of attitude as a readiness to carry out a structural process, we have explained a number of facts hitherto ascribed to attention; which means that we have been able to replace a non-

[11] This has been proved by Lewin who speaks of a "readiness to act" (*Tätigkeitsbereitschaft*) (40).

specific, ill-defined cause by one which is both specific and well-defined. The explanation is also consistent with the rest of our theory, and this consistency of the descriptive with the functional concepts employed should not be overlooked. A stepwise phenomenon, descriptively observed, and a stepwise process, functionally deduced, are thus brought into intimate connection. The structural process prepared by the attitude functions during the presence of a phenomenon as its physiological correlate, and this physiological hypothesis is determined by psychological observation; for we maintain that the physiological processes which underlie the structural phenomena must themselves possess the character of structures. This may seem to be a problem rather than a solution, but we shall presently see that even this problem has been successfully attacked.

No discussion of the differential threshold can pass by Weber's law; we shall therefore next consider the bearing of our theory upon this classic generalization. Although the theory of the Weber-Fechner law has long been controversial, we can now say that the physiological interpretation has won the field.[12] This supposes that the function connecting the stimulus with the nervous excitation which underlies the sensation is the logarithmic factor. Since our theory abandons sensation, the usual interpretation of Weber's law must be remodeled; which again shows that we are not dealing with a mere change of names, but with a very active agent. In order to elucidate this part of our theory we must enter into certain details of physiological chemistry. Let us suppose, following Köhler's inferences (38, page 6 ff and 211 ff), that our entire field of vision is filled with a uniform gray, our whole optical sense-organ being homogeneously stimulated; we should then see a gray wall or nebula, but what may the process in our brain be like? Without entering the region of mere speculation, the following assertion can be made: the chemical reaction that will take place after we have become adapted to the stimulus will be a stationary one, that is, the concentration of all the substances concerned will be held constant during the whole time. It can further be shown that, owing to the chemical composition of our nervous system, ions will take part in this process, so that a given degree of concentration would imply a definite amount of free ions. Let us now change our stimulus to one composed of two differently colored parts, say dark and light, meeting in an entirely arbitrary curve. Can the new process be

[12] A full discussion is given in Pauli's monograph (49).

fully described as two stationary processes corresponding to these two areas? An affirmative answer to this question would imply that no connection whatever exists between the two parts of the brain which are being differently excited, and since their border line was quite arbitrary it would also mean that each brain element is a miniature system insulated from each and every other element. This assumption is obviously untenable. Upon purely physico-chemical grounds we must therefore conclude that between the two regions with their different concentrations, there must take place an adjustment (*Ausgleich*) of osmotic pressure, since with a certain concentration of substance there also belongs a certain concentration of ions. As ions must take part in this process of diffusion and since different ions move with different velocities, there must arise, instantaneously, along the whole border line, a leap in the electrostatic potential. The absolute potential of each of the two areas is thus determined by the amount of this potential difference. It is not at all as though we had two areas independent of one another, each having its fixed potential, from which the potential difference arises. The opposite is true, since the fact of these two differently reacting areas coming together and forming one system is the cause for the arousal of the leap of potential and thereby determines the single potentials themselves. The term "potential difference" instead of misleading us, ought to furnish a striking analogy to our physiological stepwise phenomenon; for just as the step is a step only in a scale, so here each area has its potential only by virtue of the system in which it occurs, and just as the "upward (downward) direction" of the scale is a central property of the experience, so here the leap of potential is a central factor of the optical function.

Let us go a bit further, and put this question: how does the potential difference $\Phi_1 - \Phi_2$ depend upon the two concentrations C_1 and C_2? From Nernst's theory of galvanic chains the following formula can be deduced: $\Phi_1 - \Phi_2 = \text{const. log.} \frac{C_2}{C_1}$, and this is precisely Fechner's formula for Weber's law.[13]

We can now state the structural theory of the Weber-Fechner law. The logarithmic law does not refer at all to single sensations, but to the whole structure; and from our deduction we must even

[13] The nature of the constants contained in this formula makes it possible to calculate the approximate value of $\Phi_1 - \Phi_2$ in volts, as Köhler has shown to be the case with respect to the brightness-threshold.

infer that the concentration of ions in one area is a linear function of the intensity of the stimulus. Furthermore, what psychologists have called the process or function of comparing is not a third or "higher" factor accruing to the two sensations compared, but a moment inseparable from the whole structural system, which has been falsely singled out, just as the sensations have been falsely separated. In truth, comparison is always determined by a system in which one step necessitates another.

The closest analogy in its essentials, even an identity, exists between our psychological description and our physico-chemical deduction, although the latter in no wise presupposes the former. We have, therefore, full justification for our previous assertion that the physiological process must also be structural, for the system of the two reacting areas with their potential difference is a true structure in the strictest sense. Von Ehrenfels, in his famous article (6) gave two criteria for his *Gestalt-qualitäten,* which, though imperfect, may be applied to our structures, both the psychological and the physiological. These criteria were (1) that structures cannot be composed out of elements, but (2) they can be transposed like melodies.

Our conception has now been further enlarged; for while our deductions are in no wise dependent upon physiological assumptions, they are found applicable to purely physico-chemical facts. We may therefore accept the fact that structures exist also in the realm of inorganic nature.

Before leaving the topic of the differential limen, I wish to mention a very interesting result from some experiments with lifted weights which Borak has recently published (1). Though his paper gives a mere statement of fact, and makes no reference to structural principles, it may be referred to here for two reasons. (1) The new fact puts a new problem before structural psychology, which, as I have reason to know, has been vigorously and successfully attacked. (2) It is very surprising that this fact has not been discovered before, since it ought to have appeared in almost any of the innumerable investigations made with the method of constant stimuli. The fact is the following: the sensibility to an increase in weight is greater than that of a decrease in weight, and, within certain limits, this difference increases with the time-interval between the two lifts. I quote the results from one of Borak's tables:

Weights in Ascending Sequence	Number of Right Judgments	Weights in Descending Sequence	Number of Right Judgments
400:420	16	420:400	2
400:430	27	430:400	10
400:440	30	440:400	16
400:450	33	450:400	20
400:460	45	460:400	35
n=50			

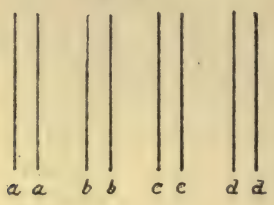
Both thresholds, the ascending and the descending, obey Weber's law.

III

In the last section I have tried to give an impression of what "structure" means, descriptively and functionally. In this part of my essay I shall report a number of experiments performed in various fields, which show the fruitfulness of our conception. First of all, let us turn to a special structure of great significance. Keeping close to the discussion of the last section, I put this question: What are the phenomena which appear when we investigate an absolute threshold, say in the auditory field? Is it not correct to say in this connection that we try to find the smallest stimulus-energy that can give rise to a single sensation? Let us seek our answer in a pure description of the phenomenal data observable during the course of the experiment. The O. sits in a noiseless room and awaits a faint sound. Is there anything auditory in his consciousness? The question would have appeared very different if we had chosen the visual field, for then the O. would be sitting in a dark room waiting for a faint light, and darkness is admittedly a visual phenomenon. But is "stillness" auditory? Let the following rhythm be beaten: —..—..—..—.., do we hear anything between the dactyllic groups? Our question now appears to be more difficult, but my answer is that the intermetric intervals belong quite as much to the whole experience as do the intrametric intervals, only they belong to it in a different manner. Or take a visual analogy: In Figure 5 the intervals ab, bc, are different from the intervals aa, bb, cc, though both belong to the "fence-phenomenon." In trying to describe this difference we find one very striking feature which we shall here single out. The white spaces in the intervals ab, bc, cd, form part of the total white space, whereas the white spaces in the other intervals are limited to the regions between their respective black lines; they do not extend beyond these regions, nor do they form

a part of the white space round about. Practised observers can even describe the curves that mark off these white stripes, which are slightly convex toward the interior. We see, then, that the white surface of our pattern, though objectively the same throughout, gives rise to two different phenomena, one being limited to the "stripes," while the other comprises all the rest of the experience. We have two expressive terms to indicate this difference: we call

FIG. 5



the one phenomenon a "figure" and the other its "ground"; on recognizing at once that no visual figure can occur without a ground upon which it appears.

Let us return now, to our auditory example. The situation is very similar, for we have two kinds of intervals, the inter- and the intra-metric. Does our distinction apply here? Clearly the intra-metric intervals belong to the rhythmic group itself, *i.e.*, to the "figure," but can we say that the intermetric ones belong to the "ground" in the same sense in which the intervals between the stripes constitute a visual ground? My observation tells me that we can, and that there exists a ground in the auditory field as well as in the visual field, or in any other sensory field. This ground may be "stillness" or it may be the mixture of street-noises which, in a city, never cease during the day-time. And now mark this: When you leave the city for the country, and sit down to work at your desk, you may be startled by a strange phenomenon, for you may "hear" the stillness. The auditory ground of your work has altered and this alteration strikes you forcibly.

To show that this is not a description made up in accordance with a predetermined theory, I may quote an unprejudiced witness. At the beginning of Ibsen's last play, "When We Dead Awaken," Mrs. Maja says, "Do listen how still it is here," and Professor Rubeck replies a little later, "One can, indeed, hear the stillness."

Returning to our threshold problem, we may therefore conclude that when the O. awaits the appearance of a faint sound, he is conscious not of auditory nothingness, but of an auditory ground; and what he is looking for is the appearance of an auditory figure, though in this case, because of its faintness, the figure may be ill-defined.

If we consult experimental procedure, this is strongly confirmed. In measuring auditory thresholds the chief consideration is not always to have the room as quiet as possible, but to have it as uniformly noisy as possible. If both postulates can be combined, well and good, but as a rule we are not able to exclude irregular outbursts of faint noises. Therefore, instead of keeping the room still, the experimenter fills it with a constant noise which is intensive enough to drown all irregular incoming sounds; as, for instance, Peters has done (50). The O.'s task is then well defined. Upon this auditory ground he is instructed to await the appearance of a circumscribed noise-quality which does not belong to the ground.

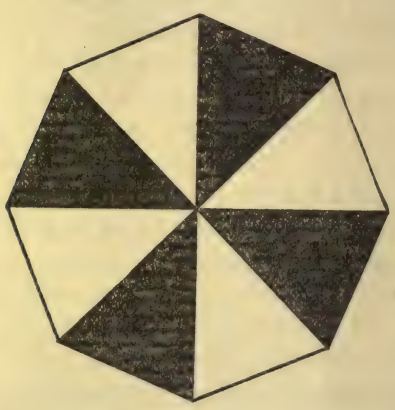
An artificial ground has been created because a constant and uniform ground is a most important condition in testing absolute thresholds. But does not this mean a reduction of absolute to differential limens? Are not the objective conditions quite similar in the two cases—a constant stimulus, and a slightly greater test-stimulus? For just as I compare the weight N with the weight N plus Δ, so here I compare the constant sound-intensity A with the slightly increased one (fall of a shot) A plus Δ. This interpretation, however, misses the psychological point; for it overlooks the characteristic phenomenal difference between the two experiences. In absolute-threshold experiments we do not work with stepwise phenomena, as we do in differential limens, for our experience oscillates between one of a uniform ground alone, and one of a quality that stands out from the ground. Our assimilative phenomenon of the "level" which lies at the basis of all quality-judgments in the differential tests, is different from what we now call a pure *ground* experience. The "level" phenomenon is always experienced with a figure lying on a ground, and although the figure itself may be inarticulated, it is nevertheless distinct from its ground.

The difference between absolute and differential thresholds is therefore well-founded, and our principles of structure enable us to comprehend it fully. The distinction is also corroborated by experiments which indicate that the two function quite differently. Specht (59) has shown that alcohol lowers the absolute and raises the

differential threshold, and we can infer from this a functional difference between the two structures—the one, a figure against a ground, and the other, a part against another part of a figure.

Having discovered this figure-ground-structure in the absolute threshold, we must now consider it more closely. Let us revert to our fence-phenomenon. We found that the white intervals belonging to the figure were bounded, while those belonging to the ground were not, though objectively there was no border line in either case. Here we have a very general characteristic, namely, that the ground is always less "formed," less outlined, than the figure. Rubin (53) was the first to investigate these facts systematically,

Fig. 6



and the following statements are largely taken from his work. His method was peculiarly well-adapted to bring out the differences of figure and ground, in employing geometrical patterns which are phenomenally equivocal as to their figure-ground structure. A simple example of such a pattern has already been discussed by Schumann (55). If we make the distances in our fence aa, bb, .. equal to ab, bc, .. we have a striking instance. For now bb may be a stripe, bc a piece of the ground, or inversely, bc may be a stripe, and bb a piece of the ground. In either case we find our old difference, that the stripes are always bounded, whether they are formed by bb or bc, while the intervals are not. Another example is offered by the so-called subjective rhythm, whether auditory or visual, which corresponds to an objectively equal series of beats or flashes.

In such a phenomenal series we again meet with the difference of inter- and intra-metric intervals, and again their coördination with the objective intervals is ambiguous. The cross in Figure 6, reproduced from Rubin, may be experienced either as a white cross on a black ground, or as a black cross on a white ground (neglecting other less important effects). Compare either cross with its ground and you can clearly recognize that the latter is always less definitely structured than the former; either the ground has no distinct shape at all, or else it approaches the comparatively simple form of a square.

Hand in hand with higher degrees of structure there goes a greater "liveliness" or vividness of the figure. As Schumann observed, the white space inside a figure is "whiter" than that outside, which can also be easily seen in the equidistant fence-design. A striking example of this is afforded by a certain kind of drawings, used frequently for advertising posters, where the contour is not fully drawn, but where, nevertheless, no gap appears in the figure. I may refer the reader to Jastrow's *Editor,* reproduced in Pillsbury's textbook (51, p. 158).

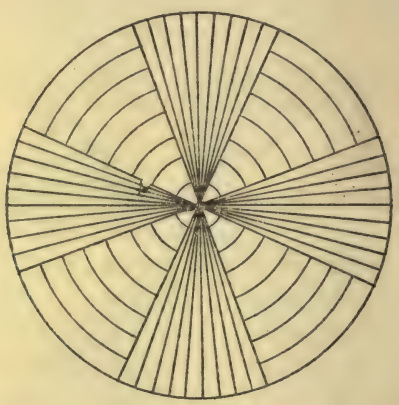
These last examples show what has already been pointed out, namely, that phenomenal figures have boundary lines even when the corresponding objective figures have none. A good figure is always a "closed" figure, which the boundary line has the function of closing. So this line, separating the fields of figure and ground, has a very different relation to each of these, for though it bounds the figure, it does not bound the ground. The ground is unaffected by the contour and is partly hidden by the figure, yet it lies without interruption behind the figure. The cross of the accompanying figure (Figure 7) will make this description clear. Look at the fields with the arcs for filling. When forming a cross, these become true arcs, *i.e.,* cut-off pieces of circles, but when forming the ground they look quite differently, for they are no longer cut off, becoming now the visible parts of a phenomenal series of complete circles.

This property of the ground, that the figure's contour does not affect it, is closely related to the first characteristic we mentioned, namely, its lesser degree of structure. In our last instance this fact is revealed by the observation that the whole circles when they constitute a ground are simpler structures than the arcs which are necessary to the formation of the cross; for in place of each single circle there appear four arcs. The lesser degree of structure leads also to another indication noted by Rubin of the difference between

ground and figure: the ground has more of a substance- and the figure more of a thing-character.

Let us return to the boundary line. From its variable relation to figure and ground there follows the inference that it must have two different sides, an inside and an outside; the one includes, the other excludes, or to use terms in this more general sense which have been suggested by v. Hornbostel (19), the one is concave, and the other is convex. Though these words are not psychological terms they are meant to indicate true psychological descriptions. Look at the left line-b in our fence-figure and you will understand what is meant by this description, for its left side is hard and

Fig. 7



repelling, whereas its right side is soft and yielding. Very full descriptions of these properties are given by v. Hornbostel who reduces the illusions of reversible perspective to a change in these properties: to reverse a figure is to make concave what was convex, and convex what was concave.

One remark here to the reader who may raise the objection that our terms do not designate the existential properties of visual phenomena, but only their intentional meanings. I have said that I wished to point out true properties. Now consider that these properties need not be like those of traditional psychology, "dead" attributes, possessing a "so-being" only, but that many of them are alive and active, possessing a "so-functioning." A beam of wood, lying unused on the floor, may look like a beam carrying weight, yet

an accurate description would have to note this fact by giving heed to the state of tension which must then exist. More generally speaking, a state of rest with an absence of force is different from a state of rest with an equilibrium of force, and the same thing holds true, in the writer's opinion, for phenomena. The border line of a figure performs a function, and this performance is one of its visual properties. Traditional psychology has *defined* the term "visual property" so as to include "dead" properties only. Consequently in looking for visual properties it has found only these. But this definition was arbitrary, and it proves to be inadequate, since it makes the investigator blind to facts of the highest significance.

Lest the reader should be inclined to consider the distinction hitherto offered as trivial, artificial, and secondary, we may turn to experiments with ambiguous patterns, where the different structures

FIG. 8

correspond to two totally different forms, whereas in the previous examples the same form, a fence or a cross, appeared in both cases. Well-known puzzle pictures fall under this head, one of which is produced by Titchener (61, p. 278)—a brain with fissures which assimilate as babies, while another example is given in Pillsbury's book (51, p. 162) as a duck's or a rabbit's head. The best example of this which I know was used by Rubin. It is a goblet, whose contours also form the profiles of two faces. Many similar patterns were employed by Martin (42). We need not, however, search for examples, since everyday life supplies us with any number of them. The simplest, perhaps, is an ordinary chessboard pattern, where at least six different phenomena may be aroused, and many others are frequently found in lace or wallpaper designs. Figure 8 is reproduced from the edging of a table cloth. You can see either the black T-shaped forms or the white leaves. On the actual frieze it is hardly possible to see both at the same time, though in our sample

this is easier. Whenever you see one of the figures only, the remainder becomes a ground of the simplest possible description.

This difference has not escaped the psychologist, but has been discussed at length. The clearest statement is given by Titchener (61), whose report I shall closely follow in my interpretation. He would say that in the beginning the black T's are at the upper level of consciousness, while the rest is at a lower level. Suddenly a change takes place, the T's drop clear away from the upper level, and the white leaves stand out with all imaginable clearness, while the form of the T's is no clearer than the feel of the book in your hand. Had he written the last sentence only there would be no disagreement between us, for the "feel of the book" belongs truly to the "ground" of the whole situation. But what he does say leaves the existence of the T-phenomenon untouched by the change in its phenomenal aspect. It has merely shifted its level, having dropped from the crest of attention to its base, from whence the leaves have now risen.

In objecting to this interpretation (which has also been vigorously attacked by Rahn), and at the same time arguing against Wundt, Rubin states most emphatically that when the T's have disappeared and we see in their place a mere ground, the T's have indeed no clearness at all, for they have become nonexistent.

In Titchener's report we recognize the typical attempt of traditional psychology to elucidate phenomena by means of the cardinal concepts stated at the beginning of this paper. Something which ought to be there phenomenally, since a corresponding stimulus does exist, is not observable, and this contradiction is overcome with the aid of attention. Yet this is no longer a description of fact, but a hypothetical interpretation.[14] For I can describe only what I can observe, what is there before me, and to say that a figure is at so low a level of consciousness that it is not observable is not a description of what is present, even though in the next moment I can reëxperience what at the time was nonexistent. If I wish to describe truly I must report positively what that part of the total phenomenon looks like which lies at the so-called basis of attention; for it is not a description of it to tell how it does not look.

To infer how something looks when it is not observable from the data of its appearance when at the crest of the attention-wave, means the acceptance of the constancy-hypothesis and a final aban-

[14] Titchener, though he recognizes that he is interpreting, seem not to be fully aware of the totally hypothetical character of his interpretation.

donment of every effort to obtain a factual verification. As Köhler has pointed out (34), if we stand by description proper, *i.e.*, by verifiable description, we must recognize that the T's have ceased to exist the moment we see the leaves, and that the T-phenomenon has been replaced by a totally different ground-phenomenon, which corresponds to the same part of the stimulus-complex. We see now what an enormous change has been effected when a figure "emerges" from its ground. Rubin gives a striking description of the shock of surprise felt again and again in such a transition, even when he tried to imagine in advance what the new phenomenon would be like.

We have seen how the concept of attention has prevented the recognition and vitiated the pure description of a very marked phenomenal difference. Yet a connection exists between the figure-ground consciousness and the attention, so-called. But, by observing the facts, what we find is a functional dependency, instead of a descriptive identity. As a rule the figure is the outstanding kernel of the whole experience. Whenever I give attention to a particular part of a field, this part appears in the figure-character. I have frequently performed the following classroom experiment: using a photographic shutter I project Figure 8 for a short time upon the wall, and instruct beforehand one-half the audience to watch the white, and one-half the black parts of the picture. I then ask the whole audience to make sketches of what they have seen. Invariably the "black" half of the audience draws the T's, and the "white" half the leaves.

Is it possible to describe the attitude of the observer which is produced by the instruction to "watch"? Again we may refer to v. Hornbostel's inversion experiments. He finds that it is more difficult to invert the convex into the concave than the concave into the convex, because whatever I am looking at, watching, acting upon, stands forth, grows fixed, becomes an object, while the rest recedes, grows empty, and becomes the ground. He also adds that since the objects obtrude themselves upon me, and come toward me, it is *they* I notice and watch rather than the holes between them. (19, p. 154.) We need only to apply this general description to our special case, and we shall see that attention has now a very definite meaning; for, in attending to the black parts, we adopt a "figure attitude" toward them by making them the center of our interest. At the same time, the part that has become the figure itself strives to become the center of our experience. This notion of the "center" will play an

important part in the later expositions of our theory; here we have simply replaced the vague concept of attention with one which is well-defined.

The functional connection of figure- and center-consciousness is not absolute. Though it is natural to "attend" to the figure we can, for a time, at least, attend to the ground, and let the figure recede. If we continue this attitude too long, however, we run the risk of a change in the phenomenon; but that such an attitude is possible—and many observations reported in the foregoing prove that it is—again demonstrates that the figure-ground distinction cannot be identified with a mere difference of the attention-level.

All good psychological descriptions must find their justification in functional facts. Phenomena that are different in description must also prove to be different in function, if the description is tenable.

Fig. 9

So we turn to the functional facts which underlie the figure-ground distinction.

Two sets of experiments have been performed by Rubin, both employing patterns of the type of Figure 9. These patterns are ambiguous, either the enclosed white space or the enclosing black space may appear as the figure. Let us call the first the positive, the second the negative reaction. According to the instructions given, it is possible for the O.'s to assume either a positive or a negative attitude before the exposure of the pattern. After some practice the attitude assumed will in most cases be effective, *i.e.,* a positive reaction will ensue from a positive attitude, and *vice versa.* In his first series of experiments, Rubin presented a number of such patterns with either positive or negative instructions. After a certain interval the experiment was repeated with instructions prescribing an indifferent attitude, neither positive nor negative. The result was that in the majority of cases a pattern once reacted to in a

certain manner was reacted to the next time in the same manner. Rubin calls this a "figural after-effect" (*figurale Nachwirkung*). It proves that the structure by which we react to a given stimulus-complex remains in the memory of the individual, a fact of paramount importance for the theory of learning, as I have elsewhere (33) shown. The problem of the second series was to find out if a pattern seen the first time under one attitude, positive or negative, will be recognized when it is seen the second time under the reversed attitude. The procedure was similar to that of the previous experiment, except that the instruction of the test-series was either positive or negative. The result was in full accordance with the descriptive distinction, for when the reverse instruction was effective no recognition took place. By overlooking this fact many troublesome mistakes are committed even in everyday life.

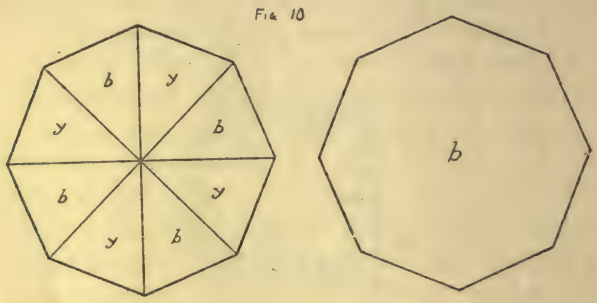
We have assigned to the figure a "thing"-character, and to its ground a "substance"-character. This description has also been justified by experiments, for we learn from Gelb's investigation (11) that the color-constancy commonly called memory-color is dependent upon the color's "thing"-character and not upon its "surface"-character. This was clearly proved by two patients with brain lesions who saw no surface-colors (*Oberflächenfarben*) and yet they made the same brightness-equations between a lighted and an unlighted color as did normal O.'s. They reacted differently only in case of a shadow, and this was because their visual apprehension was not sufficiently restored to enable them to recognize a dark spot as a shadow cast upon an object.

Before Gelb's paper had been published the connection between color-constancy and "thing"-character was suggested to Rubin by the researches of Katz (24), and Rubin concluded that because of this connection the figure-ground difference ought also to appear when the color-constancy is altered. To test this conclusion he planned two ingenious experiments. In the shadow-experiment he used a cross of the type of Figure 6, and cast a light shadow upon one of the white sectors. His O.'s reported this shading to be stronger when the white sector was part of the ground than when it was part of the cross. In the color experiment the cross was colored and observed through differently colored glasses. The result was again that the figure offered a stronger resistance to change of color than did the ground.

Starting from the greater vividness of the figure as described, I

devised the following experiment (32). I tested the power of figure and ground to resist so-called retinal rivalry. On the left side of a stereoscope I put a Rubin cross like that of Figure 6, composed of alternate blue and yellow sectors, while on the right side there was a regular blue octagon of homogeneous surface (comp. Figure 10). The left cross can appear either as a blue cross on a yellow ground, or as a yellow cross on a blue ground, and in looking through the stereoscope it is easy to see either, since the left image, with its richer detail is superior in rivalry to the right image. Beginning with the yellow cross which is a very stable phenomenon, you can accentuate the right image by moving it, or by pointing at it with a pencil, without disturbing the yellow cross. But let the blue cross on the yellow field involuntarily appear, and then accentuate the right image but slightly and the cross will disappear as the blue octagon emerges. The

Fig. 10



explanation is simple enough. There is a constant rivalry between the yellow sectors on the left and the corresponding blue space on the right, yet so long as the yellow forms the figure in the left image the structure is so strong and so fixed that it resists attack. When yellow is the ground, however, it is but loosely formed and can therefore be easily defeated by the right image. So the better formed the field is, the more vivid and more impressive (*eindringlich*) it will be, a fact which has been theoretically explained by Köhler (38, p. 206f). Discussing the electrical processes occurring in the optical system during stimulation, and making the well-founded assumption that the entire optical sector, periphery, optical tract, and cortical area together form one system, Köhler comes to the conclusion that the density of energy is always much greater in the figure-field than it is in the ground-field, and that the current (*Strömung*) is much more concentrated in the former than in the latter. It is this con-

dition of energy which helps figures to attain their phenomenal vividness, and also, as we can say after our last experiment, their superiority in rivalry.

Phenomenally, the figure is always a stronger and more resistant structure than the ground, and in extreme cases the ground may be almost formless, a mere background. For this distinction we have also found a functional counterpart. Kenkel (25) has discovered that figures, when briefly exposed, appear with specific movements which expand with their appearance and contract with their disappearance. I have (27) advanced the hypothesis that this movement, called by Kenkel the *gamma movement,* is the expression of a structural process. This hypothesis has been tested and proved by an investigation of Lindemann (28) which will be more explicitly discussed in a later article. However, one experiment of this investigation belongs in the present context. Lindemann worked also with patterns that were ambiguous in their figure-ground structure. His figures were of the type of Figure 9 and of the goblet pattern described above. If Figure 9 is positively apprehended the O. sees violent outward movements of the white teeth, whereas, if observed negatively, the black indentures, particularly the lower claw-like one, move vigorously inwards. The goblet pattern behaves similarly. If the goblet is seen, it performs extensive expansions and contractions, whereas, if the profiles appear they tend toward one another, the direction of the movement being reversed, but, on account of the close proximity of these two structures movement is in this case notably checked. These experiments show that the gamma movement takes place in the figure and not in the ground, and since they reveal a constructing process, they prove that functionally the figure is better formed than the ground.

I shall repeat here another experiment performed in the Giessen Psychological Laboratory, which has not yet been published. Hartmann (29) has investigated the laws governing the fusion of two stimuli separated by a dark interval. The O. looked through a telescope, or in most of the experiments through a blackened tube, behind which the Schumann tachistoscope was rotating. In the rim of the wheel there were two slits, separated by a variable interval. Behind the wheel was the object which in this procedure was twice exposed during one revolution. The objects were transparent figures getting their light from the rear. In accordance with the facts known about the Talbot fusion (for instance, rotating discs),

Hartmann found that the critical speed of the wheel was a direct function of the intensity of the stimulus which could easily be regulated by varying the amount of light passing through the exposed objects. By "critical" speed is meant that speed which is just capable of bringing about a complete fusion, after the last bit of flicker has disappeared. Hartmann then worked with Figure 6 as one of his objects, and he found a marked difference in the critical speed for the two phenomena, black cross on white ground and white cross on black ground. For instance, the time of revolution in the first case was 1.65 seconds while in the second case it was 1.3 seconds. Now the black sectors are no blacker than the dark interval, hence the flicker is produced by the white sectors alone; consequently the same field fuses under Hartmann's conditions more easily when it is a ground than when it is a figure. This proves again the close connection between construction or "formedness" and vividness or intensity. And this proof seems all the more convincing because it is based upon an effect which has hitherto been considered a purely physiological process of the retina. Besides, this experiment is not only qualitative, it is also quantitative, since the difference of critical speed for the two different phenomena corresponding to the same stimulus-intensity can be matched with another difference in critical speed between two corresponding phenomena (black vs. white cross) with different stimulus-intensities.

I believe that the functional facts I have adduced are sufficient to prove the essential difference between the figure and ground phenomena. This difference is fundamental and the figure-ground structure must therefore be considered one of the most primitive of all structures. I have (33) defended the view that this structure is also the first phenomenon experienced by the human infant; for instance a light patch on a dark ground instead of the various sensations with which, according to the traditional view, the baby's consciousness is supposed to be filled. This genetic consideration raises still another question. We have said that a figure cannot exist without a ground. Can a ground exist without a figure? In another connection (33, p. 97) I have tried to prove that it cannot, and that mere ground would be equivalent to no consciousness at all.

So far our observations have shown a superiority of the figure-phenomenon over the ground-phenomenon. This, however, must not lead us to disregard the latter, for the ground has a very important function of its own; it serves as a general level (*niveau*) upon

which the figure appears. Now figure and ground together form a structure, consequently the former cannot be independent of the latter. On the contrary the quality of the figure must be very largely determined by the general level upon which it appears. This is a universal fact, observed in such products of culture as fashion and style. The same dress which is not only smart, but nice to look at, almost a thing of beauty, may become intolerable after the mode has passed. Again, put a heavy modern leather club-chair into a rococo salon and the effect will be hideous. Music offers any number of examples as to the influence exerted by the general level. Each tone, each harmony, has a specific meaning, inherent in its "sound" for a given key only; but this meaning changes with the key, so that G is the tonic of G major, but the dominant of C major.

The influence of the ground appears in many psychological experiments. As Hering (15) has shown, the question of the functional dependence of the brightness of a gray upon the amount of light reflected into our eyes is unanswerable because it is incompletely stated. To solve this problem we must determine the general level. If we allow the level to vary the same amount of light in the figure may arouse a black, a gray or a white, as can easily be proved by Hering's "hole method," and the same is true if we take color into consideration. Witness the following experiment with Hering's hole method which I have often used as demonstration in a classroom. Put a white screen (of about 50 x 50 cm.) with a hole in it of about 5 cm. diameter before a white wall. Put one or two ordinary electric lamps between screen and wall so that they throw their reddish-yellowish light on the wall, and close the shutters of the room. The wall will look fairly white, so will the hole in the screen so long as you perceive it as part of the wall, seen through the hole in the screen. But you can also see the hole as part of the screen, which then becomes its ground; in which case the hole will seem to protrude somewhat from the screen and will have a distinct yellow tinge. Now throw on the screen white light from the arc-lamp of a projection lantern and arrange the intensities so that the amount of light upon the wall and upon the screen is approximately equal. The filling of the hole is then forced into the plane of the screen and has a fairly saturated color of a warm reddish-yellow. It is much more colored than it was before, while the screen now looks to be a light gray with a slight blue-greenish tint. Cover and uncover alternately the objective lens of the lantern and you can easily observe a great

change in the hole's color. Now fixate the wall, looking right under the lower edge of the screen. Again open and close your lantern. In this case you will see the fairly white wall suffering but very little change, whereas when the screen is lit up with a clear blue-green color, the hole becomes invisible.

You may object that this experiment involves a combination of memory-color and contrast. But in the first place, Jaensch has proved that these are not two different effects, but special cases of one and the same law; in the second place these terms are not an explanation of the phenomena and the facts mentioned do not readily submit to the current theories of contrast.[15]

Let us describe the facts by means of our level-concept. Consider that objectively the filling of the hole is but slightly altered by the turning on of the lantern light, which only causes it to grow a little whiter. Since this effect is opposed to the phenomenon we have described, we may for simplicity neglect it altogether. But why does the "white" wall, when illumined by the yellowish lamp, still look fairly white? There is but one sort of light in the room, excepting the traces of daylight that are not excluded by the shutters.

The light-level of the room is therefore solely determined by the lamps, and the lighted part of the room is homogeneously colored. Let us now make the assumption that every general color-level tends to look white, that, in other words, white (including gray and black) is the characteristic level-color. This will explain our fact. Now, as to the hole in the dark screen: it remains white when it appears as part of the wall, for it then belongs to this general level. But, if it appears on the screen it lies at the screen's level, and since the screen reflects no lamplight but only certain traces of daylight, the screen will therefore look almost black (white-level). As a consequence, the hole as a figure upon this ground, reflecting a light which is different from its ground, can no longer retain the same color; accordingly it appears yellowish. The color-effect is not very marked because of the great difference in brightness between the ground and the figure. The explanation for this, which also involves a law of structure, will be given in the following article.

When the screen is illuminated by the white lantern light, it forms a pronounced level, and since by the conditions of the experiment the brightness-difference between ground and figure has been

[15] Compare Jaensch (22, 23) and Kroh (39).

decreased, the figure now appears to have the color of the lamps behind the screen. The screen, reflecting white light only, does not look like a pure gray, but being much smaller than the wall, it is therefore influenced by the wall's general level, as the wall is also influenced by the "level" of the screen. Therefore the screen looks slightly blue-greenish, while the wall, in turn, is tinged with yellow. If the screen were larger, so as to cover the entire wall, it would look pure gray and the hole still more yellowish. The difference in illumination between screen and wall determines, primarily, a color-distance or a system of color-steps, the actual position of the steps being dependent upon other factors.

Turn to the second experiment. Here one remains at the unchanged level of the wall. The screen becomes now the figure upon this constant level, and since the objectively yellowish level of the wall looks almost white, the screen must appear of a pronounced bluish color, though it, too, is objectively white.

In other words, objective white looks white when it is the "ground" of the observation, and objective yellow looks yellow when it is a "figure" upon this "ground." Similarly, objective white looks bluish when it appears upon an objectively yellow ground, and objective yellow looks white when it forms a ground—all of which may take place under the same objective conditions. From this we can draw the conclusion that a field, reflecting a certain amount and quality of light, depends for its phenomenal color-quality upon the ground on which it appears.

Thus our experiments are arguments in favor of our initial assumption, and this assumption furnishes a true psychological interpretation of the observation of Helmholtz, who maintained that we are unable to recognize a true white without comparison. Since, according to his theory, a sensation of white is composed of the sensations of the three cardinal colors mixed in certain proportions of intensity, and since the comparison of the intensities of colors is difficult and uncertain, therefore, in the absence of a true standard, we are very often mistaken and judge a sensation to be white, when in reality it is not white, but colored.

Our conception (*Begriff*) of white, is thus subject to change, while the sensation remains constant (13, II, p. 223f, 1st ed., p. 396f). This theory involves the constancy-hypothesis, deducing the actual though misjudged sensation from the nature of its stimulus.

Furthermore, it draws a distinction between the true sensation and our judgment of it. Having abandoned this position, we can resolve the statement of Helmholtz into our own terms by saying that if the general level is produced by a colored light, then we *see* it as white. Helmholtz characteristically bases his theory upon a number of experiments similar to those from which we started. Let us return to our experiments and leave everything unaltered except that instead of a white light, we throw saturated yellow light upon the screen. If the intensities upon the screen and the wall are fairly equal the objectively yellow hole will appear to be distinctly bluish. The explanation follows from what has already been said. In a third experiment we use the same arrangement as in the first—white light on the screen, both wall and screen receiving approximately the same intensity—and we see a hole slightly lighter or darker than the screen and of a different color. Now slowly change the illumination of the screen, for instance by moving the objective lens of the projection lantern, and a distinct change will take place in the objectively unaltered hole, whereas a change upon the screen is hardly noticeable.

This experiment shows that the general level offers a greater resistance to changes in the objective conditions than does a single figure. The physiological explanation follows from the general physiological theory of the figure-ground structure. Since the density of energy is greater in the figure-field than in the ground-field, any change of the whole system will appear with greater strength in the figure than in the ground. This relative stability of a general level is probably the fundamental fact in all our so-called "color-transformations." Nor does this fact contradict the results of the experiments previously described, in which the figure, by virtue of its "thing-character" proved to be the more constant; for in these other experiments the general level of the whole experience was never involved.

In the realm of space the general level plays a rôle no less important. Witasek (66) has described the following method of testing the single "space-values" of the retina. One single point of light in a totally dark room is presented in different positions with head and eyes fixated. Under these so far unrealized conditions Witasek expected to secure an exact determination of pure space (local) sensations. Try this experiment yourself and you will find it altogether impossible; for after you have stayed some time in total darkness, a single point of light has no definite position at all; if

continually exposed, it wanders about, even when fixated, making so-called autokinetic movements.[16]

If the exposure is only momentary the point of light is neither clearly nor fixedly localized, and the crudest mistakes in localization occur. After watching these autokinetic movements for some time, the floor under your feet, the very chair you sit on, begin to lose their hold.

All this means that a definite single phenomenal position exists only within a fixed spatial level. If the conditions for the formation and conservation of such a level are absent, localization is no longer possible; for just as the level grows unstable so does the single point within it.

The spatial level has, however, a marked tendency to remain constant, together with the common directions of "above" and "below," "right" and "left." We shall see in the next article what a strong influence these common directions exercise upon the formation of structure. For our present purpose we need only point out that "above" is not necessarily something depicted upon the vertical meridian of the eye below the fovea, since this is true only when the eyes are in a special position with head erect and eyes looking straight forward. When writing at my desk, for instance, this same part of my retina gives the impression of that which is farther away. It comes, to be sure, from the upper part of my manuscript but this is not "above" me. As a rule, the general level remains unaltered, despite changes in phenomena produced by movements of the eye, the head, the whole body, or indeed movements of the surrounding objects. But let yourself be rapidly turned around several times, or let the surroundings be revolved about you, and everything is changed; all orientation is lost and giddiness results. The effect when your surroundings revolve is produced by visual influences alone, but when you are yourself moved, the vestibular organs play a part. This, however, does not impair our theoretical position for it only goes to show that spatial level is dependent upon these sense-organs.

A third system upon which our spatial level depends is formed by the sense-organs of skin and muscles. In a very ingenious investigation, Garten (9) has tested our capacity to recognize the position of the body relative to the vertical. He constructed a special tilt-table which could be immersed in water so that the effect of gravity

[16] Compare, for instance, Wertheimer (64).

could be almost totally neutralized. Under these conditions, orientation was considerably disturbed, which again indicates the importance of the sensory systems named.

The term "spatial level" (*Raumlage*) in the specific meaning here employed was used for the first time by Wertheimer (64) who also maintained that the Aubert phenomenon (A-P) depends largely upon a shifting of this level. This phenomenon and a number of related facts have been extensively investigated of late by G. E. Müller (46), but before we turn to these facts we must introduce some of the concepts used by Müller to explain the A-P, which are also applicable in our determination of the spatial level. Müller, investigating the localization of visual images (45), found that an ego-centric localization can be referred to three different systems of coördinates: the visual (*Blick*) system (*V. system*), the head system (*H. system*), and the "standpoint" system (*S. system*). The V. system may be defined by the three main axes of Hering's imaginary "Cyclopean" eye; the H. system is represented by the head, one axis being the basal line, the other two lying in the median plane of the head at right angles to the first; while the S. system is determined by the normal position of the trunk. In normal positions of trunk, head and eye the three systems fall together, while in other positions they may differ so that each in turn may determine the localization. Müller inferred these systems primarily from results obtained with images, but he could show also that they play a part in perception and recognition, for instance in reading.[17]

In the following consideration of the A-P we shall refer merely to the V. and S. systems. An O., inclining his head, say 90° sidewards, in a totally dark room, is shown a single vertical line of light (*Leuchtlinie*). He sees this line not as vertical, but inclined in a manner contrary to the inclination of his head. The inclination, considerable though it may be, never, or at least very rarely, reaches the full degree of the head's inclination, even when we deduct the effect produced by the compensatory swivel-rotation of the eye. This is the gross phenomenon of the A-P; it can be described, using Müller's terminology, in the following manner: "The apparent position of the vertical line lies between the two positions which it would have if either the V. or the S. system were alone operative. The V. system would make the line vertical, since it is parallel to the basal line which now is vertical, while the S. system would make the line horizontal,

[17] See Müller (46, p. 238f). Oetjen (47).

since normally a line cast upon the horizontal meridian of the eyes, as this vertical line now is, would be a horizontal line. For simplicity's sake we shall neglect the swivel rotation. Müller explains the actual apparent position of the line as a compound effect resulting from the competition of the two systems, and speaks, therefore, of the V. and S. components. This explanation is corroborated by another form of the phenomenon appearing mainly with slighter inclinations of the head, which we shall here omit.

For Müller these systems are a product of experience and they work according to the general law of association. They can also be expressed by ascribing to each retinal point, not one, but two, values, a V. and an S. value. We see that Müller does not use our concept of a spatial level but operates with single elementary effects, the V. and S. components (resulting from corresponding space-values) which enter into an additive combination. But, like all theories of this sort, it must be supplemented, as we shall presently see, by the employment of such concepts as "apprehension" and "judgment." We may proceed by reporting from Müller's monograph (46) which contains an excellent summary of the existing literature, as well as a number of further facts.

1. We saw above that in eye- or head-movements our general level is not changed. Consequently objects do not seem to move when we move our head or eyes. But this holds only at a fixed level where the visual field contains points of "anchorage" (*Verankerungspunkte*). In the dark, where such points are missing, a single vertical line of light may appear to be moving about a vertical axis in a direction contrary to that of the head's movement. This shows that the effect of head-movements on visual objects is a function of the fixity of the spatial level, since, as we have already seen, in total darkness this level loses its stability.

2. If we observe the line of light with head inclined in a lighted room it appears to be vertical when the light is turned out, and with many O.'s it maintains at first its initial vertical position, and then passes gradually into its final oblique position. Müller considers this to be the effect of a general spatial perseverative tendency. (*Beharrungstendenz*). But what is it that perseveres; is it the line itself, or is it primarily the initial space-level of the lighted room? All the facts here adduced speak for the latter interpretation and against the former which Müller accepts. (See particularly No. 5, below.)

3. Some authors maintain that the A-P also appears, though in a lesser degree, when the head remains erect, if the rest of the body is turned about its sagittal axis. This result, which has not been confirmed by all investigators, seems largely dependent upon individual differences and upon the method by which the position of the body is maintained. Yet, like Müller, we have no reason to doubt that it may occur. Müller explains it by the associative law of substitution. I cannot here set forth the reasons why I am unable to accept this explanation, but the reader will understand that the *Gestalt* theory is fundamentally incompatible with the associationist's principles. According to our conception the fact under discussion signifies that the spatial level may be altered by unnatural positions of the body, even if the head remains in a normal position, and that this change of level is similar to that of the A-P proper. The individual differences, and the differences between the results of different authors, can then be also understood; for the stability of the spatial level is very different with different individuals, as has been clearly shown by Wertheimer (64), and different experimental conditions will therefore not be of equal effectiveness in producing a uniform change of level.

4. Many O.'s report that they feel very uncertain in judging the position of the line, since they have lost their standard of the vertical, and the same O.'s show great variability in their final judgments. Apparently Müller considers this only as a matter of judgment, but again we cannot accept the distinction he draws between the phenomenon itself and the judgment of it, in which marked properties of the judgment are not considered to be founded in the phenomenon. We must ask, instead, what are the properties of the phenomenon, and what are the causes of these properties which lead to an uncertain and variable judgment? Our answer is that such judgments are based upon uncertain and variable phenomena. "Uncertainty" or "undeterminateness" may quite well be a property of visual phenomena, as Katz (24) maintained for the "distance" of his so-called "film-" colors (*Flächenfarben*), and both the undeterminatedness and the variability of this phenomenon are readily explained from our point of view. We have recognized the paramount importance of visual points of anchorage for the spatial level. When these are lacking, the level loses its hold, since the position of any single object depends upon the general level, and if the O. no longer has this, the position itself is no longer fixed or unambiguously determined.

Instead of employing this descriptively and functionally well-defined concept of the spatial level, Müller and his followers distinguish between the phenomenon and the means whereby we orientate ourselves to it, the absence of points of anchorage being for P. Busse (3, p. 19), the absence of objects that can give us information about the inclination of the observed line.

5. During a longer observation, the line of light does not, as a rule, maintain its position. In the majority of cases its angle of inclination is increased toward the vertical. Müller suggests several explanations for this, maintaining that the V. component loses in weight, since with the passing of time the impression of the head's inclination loses in intensity; since, however, this explanation is insufficient, he also suggests a tendency to decrease the influence of the V. component which is purely visual in origin. Yet the observed fact fits very readily into our explanations; for the longer the points of anchorage are lacking, the more the spatial level will change, and in consequence of its great instability the more it will deviate from its normal standard. The rarer cases in which a change takes place in the opposite direction simply prove again the general condition of instability; for they can be fully explained only when we know in detail all the factors upon which the level depends. In this connection we are reminded of the vestibular and the skin-muscle systems, to both of which we would ascribe a direct influence upon the level, and not merely an indirect influence upon our judgment concerning the head's inclination, as Müller states the case with reference to the vestibular organ.

6. Some O.'s, particularly those who report uncertainty of judgment, show a tendency to persist in judging the line vertical. Again Müller explains this as a tendency to judge "without sufficient foundation," but he also admits the possibility of an illusory perception, caused by the O.'s imagination, which, in some persons, exercises a strong influence over the apparent position of the line. He calls this the "vertical tendency." From this vertical tendency he distinguishes such cases as those in which the O., with head but slightly inclined, judges the line of light, when momentarily exposed, as either uncertain or vertical. In cases of this sort he says that the line was not apprehended long enough. Apart from this method of interpretation the facts are as follows: When the level is unstable—and the influence of the imagination is nothing but an expression of its instability—the O. can see the line at will in different positions;

the more prominent character of the vertical direction can then be influential. A momentary exposure is a favorable condition for instability because the peripheral (stimulus-determined) conditions of the whole (physiological) process, comprising the entire optical system, are weakened. Such a weakening always increases the effectiveness of purely structural factors. This has appeared clearly in Lindemann's investigations (**28**).

The conclusion we draw from these facts is not that Müller's theory is altogether wrong; for when we discard from it the concepts of apprehension, judgment, imagination and association[18], the competition among the two or three components remains. Only we would refer their effect to the general spatial level and not directly to the line. The components, therefore, find a place in our system as functional but not as descriptive facts.

Experimentally, we can destroy a fixed spatial level; we can also make one level give place to another, as has been shown by an experiment of Wertheimer's (**64**). Put a mirror in an inclined position upon a table. That part of the room seen in the mirror will then look abnormal. Objectively vertical lines will be inclined, and if a person visible in the mirror drops an object, it does not appear to fall vertically. Now hold a tube to your eyes excluding the whole "real" room from your vision and continue looking into the mirror. Let other persons walk about and do things in the visible section of the room. Very soon everything will be all right again; the floor will assume its horizontal position, the chairs will stand vertically upon it and objects will no longer be seen in an angle smaller than 90°. You can measure the change by executing an apparently vertical line at the beginning and at the end of the experiment, and then determine the angle between these two.

In the three systems, the V., the H., and the S. system, we have found factors which enter into the constitution of our spatial level, and this last experiment has shown that the visible world itself is a concurrent factor. This is a fact of very general significance. Standing in a room of average size the direction "straight ahead" is not under all conditions the sagittal axis of my Cyclopean eye; for the most part it is the direction toward the wall, with which

[18] That association is quite out of place here will appear when in our next article we are able to prove that the principal directions of space do not owe their prominence to experience and habit, but to an imminent law of structure, in consequence of which Müller's three systems cannot be accepted as habitual tendencies.

the plane of my face forms the smallest angle. It is I who am turned out of the main direction when I gaze obliquely towards the wall. This influence of the objective room-structure upon the space level is very different with different individuals. Yet the normal effect for the majority of persons can be shown by the following experiment. Since the discovery of v. Hornbostel and Wertheimer (20), we know that the apparent direction of a noise depends upon the time-difference with which the sound-waves strike the two ears. By inserting pipes of variable length, like trombone pipes, between the source of the sound and each ear one can, by drawing out or pushing in these pipes, readily make the noise wander from one side of the head to the other. One can also try to bring it to the middle or straight ahead. After some practice, this can be done with great precision and subjective certainty if one sits in a "good" position, *i.e.*, if one of the walls of the room serves as a frontal-parallel orientation. But if a wall is lacking, or if one sits somewhat obliquely, the same task becomes very trying. When I had acquired an enormous practice after several thousand experiments, working with closed eyes, I was still unable to find a good middle position for the sound under these conditions. The auditory middle, the phenomenon provoked by the time-difference zero, coincides with the sagittal axis of the Cyclopean eye, but in an oblique position this was not "straight ahead" for me, since the walls of the room influenced my spatial level, and consequently the auditory cue failed. Referring back to the beginning of this paragraph, I may add that these experiments also indicate descriptively the existence of an auditory space-level; for when the noise of a metronome stroke occurs, it enters into a thus far empty, yet phenomenally existing, auditory space. We find, too, that the stability of objects within a given level depends upon the quality of the object. Thus Busse (3) found that fine black vertical threads were much less stable than thicker brown ones which carried red and black wooden beads at fixed distances.

The conclusion is that normally we possess a general spatial level within which we are anchored. When we lose this anchorage, we are practically lost. Yet even this effect of optical vertigo has been explained by experience! When a room is rotated around us, "experience" should tell us that the room is fixed and that consequently we are ourselves rotating. Think of the man who daily operates such a machine of deception and who knows by experience

of long standing that the room does move; will this man entering the rotating chamber with his knowledge grow giddy, or will he not? Practice in the room may no doubt modify the effect, just as does practice on the merry-go-round. But it is only by practice and not by knowledge or experience that the individual can succeed in maintaining a fixed level of any sort under these trying circumstances. With the aid of our level-concept we can also understand the so-called (physiological) relativity of movement. A person looking from a bridge into a rapid stream soon has the impression of being himself moved. Seated in a train which is standing in a station, we are often unable to decide whether it is our train or the one on a neighboring track which is beginning to move. One explanation of the former effect actually maintains that the movement of a small piece of the bridge which belongs to one's field of vision is *more probable* than the movement of so large a surface as that of the stream! But we should say that normally there is no choice as to where we shall place our anchorage; for, in most cases, even with the strongest impulse of our will, we cannot alter this anchorage (see Wertheimer [64]). Normally it is something quite independent of our will—a compulsory perception founded in properties of the objective field which determine for us what parts are to appear as figures and what parts as ground; as v. Hornbostel (19) puts it: *things* are not holes in the world of experience. On the other hand ambiguous situations occur in which two or more anchorages are equally possible, though here, too, law reigns and not chance. The chief rule for these ambiguous cases is this: that the objects which form the (dynamic) center of our visual world are at the same time our points of anchorage. When I am playing cards in my compartment I see the train move on the next track even if it is in reality my own train which is moving, but when I am looking at the other train, searching perhaps for an acquaintance in the coach, then it is my own train which seems to be moving. Psychologically, *i.e., phenomenally,* there is no relativity of movement.[19]

But our level-concept has still a wider application. We have already referred to certain instances, such as fashion and style. Experimental psychology has also studied certain facts about the phenomenon of the level without recognizing them to be such. What I mean is best explained by referring to some of Hollingworth's experiments upon the indifference-point (I.P.) (17, 18). Many

[19] Nor of size either, as Wertheimer (64) has shown.

investigators, testing a scale of magnitudes, have found the existence of an I.P.; that is, while most members of the scale were estimated with a constant error, positive or negative, small magnitudes being overestimated and large ones underestimated, there comes a point where no constant error occurs. Though the fact has been confirmed over and over again, and in very different fields, yet, strangely enough, there has been a wide divergence of opinion as to the absolute position of the I.P. This startling fact suggested to Hollingworth the idea that there must be a mistake somewhere in the way the question is put. Is there, he asks, an absolute I.P. independent of the position and extent of the test-series, or is this I.P. a function of the total scale? He was able to demonstrate by a number of ingenious experiments that the latter is the correct assumption. Working with the reproduction of hand-and-arm movements, he arranged three series of experiments; A, including magnitudes of 10 to 70 mm. (with increments of 10 mm.); B, magnitudes of 30 to 150 mm. (with increments of 20 mm.); and C, magnitudes of 70 to 250 mm. (with increments of 30 mm.); each scale consisting of seven different magnitudes. Upon a given day only one of these series was used. The I. P. of series A fell at about 40 mm., of B, at about 75 mm., and of C at about 125 mm., that is, it was always found to be approximately at the center of the scale. Smaller magnitudes were overestimated and larger ones underestimated. There was no absolute I.P. The magnitude of 70 mm., being the upper limit of A, and the lower limit of C, and near the middle of B, was underestimated in A (minus 10.2), overestimated in C (plus 16.5), and reproduced fairly accurately in B (plus 1.7; p.e. 10.3). To check this result, four months later, the three magnitudes of 10 mm. (always overestimated), 250 mm. (always underestimated) and 70 mm. (variable with the series) were tested singly on occasions several days apart, but for none of these three did a constant error occur.

In still another very clear experiment, the shifting of the I.P. itself was demonstrated. A set of standard magnitudes was prepared ranging from 10 mm. to 60 mm. (by increments of 10), from 60 mm. to 150 mm. (by increments of 15) and on to 250 mm. (by increments of 20). The standards of the 10 mm.–60 mm. were now given and reproduced in chance order, five trials being given for each magnitude. Then, without the knowledge of the O., the next magnitude was added and again five trials made of each standard.

This was continued until the whole series of seventeen standards had been offered. The success of this experiment was remarkable. The I.P. rose with the introduction of each new standard magnitude; constant errors which were positive from the beginning, increased throughout the series, while constant errors which were negative in the beginning likewise underwent a continual change, decreasing to the zero point and emerging again as positive increments.

Hollingworth concludes, "that the phenomenon of the indifference point . . . is of purely central origin" (17, p. 21), and this theory is as close to the one we propose as the general theoretical position of psychology at the time of his investigation would admit. According to his results, the I.P.-phenomenon belongs not to memory but to perception, and as an analogy he refers to type-concepts, such as race and class (18, p. 468). He also speaks of a "mental set", meaning by this "that we are adjusted for or tend to expect the average magnitude, and to assimilate all other magnitudes toward it, to accept them in place of it" (17, p. 39). But he insists on employing the term "judgment"; the error to which this tendency leads, he says, "is distinctly an error of judgment, and is quite independent of sensory or physiological conditions" (18, p. 469).

Again the distinction drawn between sensory components and judgments of peripheral and central factors vitiates his theory. Leaving these out of account, and referring the reader to the next article for a discussion of the difference between peripheral and central factors, which takes on a very different aspect in our theory, we may here draw the following conclusions. In reacting to a definite scale of stimuli we establish a general level which, in the case described, as in many others, is both motor and sensory. The effect of each single stimulus is dependent upon this level, much as the figure is dependent upon its ground. And secondly, the general level holds together the whole group of phenomena corresponding to the scale of stimuli. Although they may rise or fall from this level, the phenomena never lose their existential connection with it, and being attracted by the level, the result is often a wrong judgment or a false reproduction. This attracting or assimilating effect of the level is a special case of our general law of levelling (discussed above). We see further that this level adapts itself automatically to the scale and this process of adaptation must therefore be explicable in terms of our general physiological theory.

Hollingworth rightly gives a wide application to his results, comparing the I.P.'s of different investigators with the range of their scales, and he has himself confirmed his "law of central tendency" in a purely sensory field by experiments upon the size of gray squares. I may also add in this connection that what G. E. Müller calls the "absolute impression" (*Absoluter Eindruck*) is just such a rise or fall from a general level. Whenever an O. makes a judgment that is not based upon a comparison between two stimuli, he is reacting not to a stepwise phenomenon, but to an emergence from the general level. With this I must bring my first article to a close.

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NOTES AND NEWS

A psychological fraternity, Alpha Psi Delta, was organized over a year ago and has at present chapters at Miami University, Ohio State University and the University of North Carolina. Its purpose is to stimulate interest among college and university men in the study of psychology and to promote good fellowship among those who have such definite interest. The local chapters elect to membership advanced students doing meritorious work in psychology as well as male faculty members of the psychology department. While no program is prescribed, the chapters find it profitable to meet regularly, often with an informal dinner, following which some member leads the discussion on a topic in which he is particularly interested. This serves to get the students and faculty closer together, promotes departmental unity and arouses considerable interest in psychology. There is nothing in the policies of the fraternity that would detract from the interest of its members in the American Psychological Association. In fact the bulk of the fraternity's members are ineligible for membership in the Association but have an interest in psychology which should be fostered. The national officers at present are H. E. Burtt, president; J. F. Dashiell, vice-president; H. W. Crane, secretary; and A. P. Weiss, treasurer. Any of the officers will be glad to answer inquiries regarding the fraternity.

William Berry, Instructor in Psychology in the University of Chicago, has been appointed assistant professor in the University of Rochester, N. Y.

Attention is called to the report of the Committee on Legislation and Information of the Section of Clinical Psychology of the American Psychological Association, recently published in the *Journal of Criminal Law and Criminology* (1922, 13, 70–73). The report quotes the laws of various states authorizing psychologists to perform professional services in connection with mental deficiency, etc. In Kansas, Wisconsin, New York, and in Tasmania the certification of feeblemindedness is made by two physicians or by a physician and a psychologist; in Illinois commitment is made on the testimony of a physician or a psychologist; in California commitment is made on the report of a psychologist, and freedom from restraint for the Pacific Colony of incurable maniacs or dements as well as the feebleminded is permitted, after sterilization, on the recommendation of a psychologist and a physician; in South Dakota, a psychologist is required on the State Commission for the Control of the Feebleminded, of which commission the psychologist is the secretary. Copies of the report may be obtained from Dr. David Mitchell, 160 West 85th Street, New York City, present Chairman of the Committee on Information and Legislation.

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THE PSYCHOLOGICAL BULLETIN

1. GENERAL

714. Ziehen, T., Die Beziehungen der Lebenserscheinungen zum Bewusstsein. *Abhandl. z. theoretischen Biol.*, Heft 13 Berlin, 1921, **66**.

Verf. erörtert unter kritischer Berücksichtigung des Vitalismus den Begriff der Lebenserscheinungen und hierauf den Begriff des Bewusstseins. Insbesondere wird die Frage unbewusster psychischer Prozesse ausführlich behandelt (Einteilung der bewussten Prozesse in attendierte und nicht-attendierte, der attendierten in egotale und anegotale, d.h. mit oder ohne Denken einer Ich-Beziehung; unbewusste psychische Prozesse werden abgelehnt). Es folgt dann die Besprechung der Kriterien für das Vorhandensein von Bewusstseinsprozessen und eine eingehende Erörterung, wie weit die Zuordnung von Bewusstseinsprozessen sich innerhalb des menschlichen Körpers, innerhalb der Tierreihe erstreckt usf. Hier sei nur erwähnt, dass Verf. die Beschränkung der Bewusstseinserscheinungen auf die Grosshirnrinde im üblichen Sinn bekämpft und in den erkenntnistheoretischen Schlussbemerkungen den hylopsychismus vertritt.

Th. Ziehen (Halle)

715. Friedmann, C., Psychologische Momente in der Ableitung des Apriori bei Kant. *Kant-Studien*, 1921, **26**, 312–350.

Die Marburger Schule und auch Windelband nehmen ein in unserer Vernunft begründetes Apriori als Voraussetzung unserer wissenschaftlichen Erfahrung an. Diese Richtung lehnt das Entwicklungsprinzip zur Aufdeckung des Apriori ab. Dagegen wollen die Anhänger der kritischpsychologischen Philosophie das Entstehen des transzendentalen Apriori aufzeigen. Sie analysieren nach psychogenetischer Methode die in der Erfahrung gewonnene Gegebenheit. Sie berufen sich auf das in der Erfahrung gewordene Apriori. Es wird gezeigt, dass Kant selbst sowohl die von ihm geschaffene trans-

zendentale als auch die psychologische Methode verwendet. In der Ableitung der reinen Anschauungsform des Raumes wird eine Verwechslung von Abstraktion mit Vorstellungsmöglichkeit gesehen. In der Nichtvorstellbarkeit des Raumes und der Nichthinwegdenbarkeit der Zeit soll das psychologische Motiv zu suchen sein. Auch die transzendentale Apperzeption schöpft aus dem Erlebnis Ebenso beruht die Notwendigkeit des Kausalitätsgesetzes auf einem psychologischen Motiv und stammt aus dem Erlebnis des Handelns und Wirkens. Bei Kant verschmilzt die psychologische Notwendigkeit mit der logischen transzendentalen Notwendigkeit und dies wird als Versöhnungsmotiv der verschiedenen Richtungen der Kantschen Philosophie angesehen.

L. Habricht (München)

716. Wichmann, O., Genie und Tragik. *Kantstudien,* 1921, **26**, 351–389.

Das Wesen der Tragik wird gesucht in einem eigentümlichen Verhältnis von Freiheit und Notwendigkeit: Freiheit von den Bedingungen des gewöhnlichen Lebens, sich steigernd zur Unbedingtheit des wirklich unbedingten—dämonischen (Plato, Göethe)—Wesens, oder im Willen zur Freiheit die eigene Begrenztheit zur Unbedingtheit erhebend. Notwendigkeit-Unabwendbarkeit des Unterganges-prägt sich also umso mehr in einem Schicksal aus, je stärker der Drang nach Freiheit, nach Unbedingtheit ist. Die Behandlung der Darstellungen in Theorie, Werk und Leben grosser Dichter und Denker rechtfertigt den Titel ebensosehr, wie die feinsinnigen Ausführungen über, "Freiheit als Unbedingtheit." Die, Mythisierung dieses Jenseitig-Unbedingten in der menschlichen Natur in Form der Vergöttlichung (Antike Tragödie), wie als übersinnliches in der Seele des tragischen Menschen sind die weiteren Themen dieser inhaltsreichen Untersuchung.

B. Klopfer (München)

717. Stern, W., Der Formvariator. *Zeits. f. pädag. Psychol.,* 1922, **23**, 131–137.

Beschreibt ein vom Verfasser konstruiertes Hilfsmittel zur Prüfung und Erziehung der dynamisch geometrischen Raumauffassung, das im psychologischen Laboratorium der Hamburgischen Universität verwendet wird. Der "Variatorwürfel" ist ein Gerüst aus 12 Metallstäben mit elastischen Eckenverbindungen. Er

gestattet die mannigfachsten Umwandlungen in zwei- und dreidimensionale Formen. Er ermöglicht eine Diagnostizierung des für gewisse Berufsarten wesentlichen der Sonderbegabung, sich nicht nur ruhende Formen, sondern auch ihre Verschiebungen und Projektionen, ihre durch bestimmt gerichtete Kräfte bewirkte Überleitung in andere Formen innerlich vorzustellen.

H. Bogen (Berlin)

Lippmann, O., Bibliographie zur psychologischen Berufsberatung, Berufseignungsforschung und Berufskunde. Unter Mitwirkung von Franziska Baumgarten. *Schriften z. Psychol. d. Berufseignung u. d. Wirtschaftslebens.* Heft 20, 1922. 60 S.

Die Bibliographie enthält, alphabetisch nach Verfassernamen geordnet, etwa 900 Titel von teils wissenschaftlichen, teils populären Arbeiten, Zeitungsartikeln usw. der deutschen und ausländischen Literatur, nebst einem Hinweis auf wichtige Referate. Durch ein sehr eingehendes "Sachverzeichnis," in dem auf die angeführten Arbeiten verwiesen wird, wird versucht, ein System des behandelten Wissengebietes zu schaffen. Die Benutzung der Bibliographie wird auch dadurch erleichtert, dass die mehrfach vorkommenden Zeitschriften-Titel zusammengestellt sind, und dass dabei auf alle in der betr. Zeitschrift enthaltenen citierten Arbeiten verwiesen wird. Die Bibliographie wird im Institut für angewandte Psychologie fortgeführt.

O. Lipmann (Berlin)

719. Baade, W., Eine Korrelationsrechenmaschine. *Zeits. f. angew. Psychol.*, 1922, **20**, 223–225.

Die Vorrichtung gestattet ein sehr schnelles Errechnen des Korrelationskoeffizienten nach der Spearmanschen Formel. Auf die Schale einer Zeigerwage sind Gewichte aufzulegen, deren Schwere proportional ist dem Quadrat der Rangplatzdifferenzen. Der Koeffizient kann dann an der Skala abgelesen werden.

H. Bogen (Berlin)

720. Baumgarten, F., Die "II. Internationale Konferenz für Psychotechnik, angewandt auf Fragen der Berufsberatung und Arbeitsorganisation" in Barcelona. (28–30 September, 1921.) *Zeits. f. angew. Psychol.*, 1922, **20**, 248–258.

H. Bogen (Berlin)

721. Plaut, P., Zur Psychologie des Krieges. Bibliographischer Sammelbericht. *Zeits. f. angew. Psychol.*, 1922, **20**, 281–286.

Enthält ausführlichen Nachtrag zur Bibliographie des Verfassers in: *Beiheft z. Zeits. f. angew. Psychol.*, Nr. 21, 1920.

H. Bogen (Berlin)

722. Stern, W., Das psychologische Laboratorium der Hamburgischen Universität. Gesamtbericht über seine Entwicklung und seine gegenwärtigen Arbeitsgebiete. *Zeits. f. pädag. Psychol.*, 1922, **23**, 161–196.

Als Sonderabdruck erschienen bei Quelle & Meyer, Leipzig, 1922.

H. Bogen (Berlin)

723. Hunziker, H., Vom Wert der Zensuren. *Schweizer. pädag. Zeits.*, 1922, **32**, 39–45.

Verf. hat Zensurenstatistiken nach Lipps'schen psychophysischen Massmethden verarbeitet, um den Wert der Zensur als Leistungsgradmesser zu überprüfen. Es ergibt sich eine recht geringe Schwankung der mittleren Werte erster Ordnung beim Vergleich der mittleren Klassennoten eines Lehrers in mehreren aufeinanderfolgenden Jahren. Der "strengste" Lehrer beurteilt im Durchschnitt nur um eine halbe Zensurstufe neidriger als der "gefälligste" Lehrer. Dieses Ergebnis trifft dann nicht ganz zu, wenn man die Differenzen zwischen zwei Klassen bei Beurteilung durch denselben Begutachter vergleicht mit denen gleicher Altersstufen durch verschiedenen Begutachter; sie sind dann im ersteren Falle leicht grösser als im letzteren. Mit zunehmendem Alter nähert sich die Verteilung der schlechten und guten Fälle immer mehr dem Wert an, der die symmetrische Verteilung darstellt. "Man darf sagen, dass die Lehrer ihre Schüler in hohem Grade ähnlich, um nicht geradezu zu sagen gleichartig zensieren."

H. Bogen (Berlin)

724. Otis, A. S., A Method of Inferring the Change in a Coefficient of Correlation Resulting from a Change in the Heterogeneity of the Group. *J. of Educ. Psychol.*, 1922, **13**, 293–294.

Otis presents a formula for determining the coefficient of correlation to be expected from a given group when the correlation for a

group of different heterogeneity is known. This formula is derived from the Otis Difference formula previously published.

A. T. Poffenberger (Columbia)

725. Ruckmick, C. A., A Cabinet for Colored Papers. *Science*, 1922, **56**, 76–77.

G. J. Rich (Pittsburgh)

726. Ginzburg, B., The Quest for Objectivity in the Study of Human Phenomena. *J. of Abnor. Psychol. and Social Psychol.*, 1922, **16**, 367–373.

The article begins by pointing out the incompleteness and inconsistency of the behavioristic system, quoting the views of several French authorities on the value of introspective psychology. It then passes to the discussion of the work of a group of French thinkers who "have shown the fallacy of studying the individual isolated from his social frame-work," and the institution of the "Sociological School." An account is given of its brilliant but brief existence.

D. A. Macfarlane (Boston Psychopathic Hospital)

3. SENSATION AND PERCEPTION

727. Noltenius, F., Raumbild und Fallgefühl im Fluge. *Arch. f. Ohren-Nasen und Kehlkopfheilk.*, 1922, **108**, 107–126.

Der Verf. berichtet über Beobachtungen aus seiner Fliegerzeit und Versucht sie in die herrschenden Theorien über das Zustandekommen des Raumbildes und der Orientierung des eigenen Körpers einzufügen. Zwar geht er mit Vorliebe auf die langst überlebte Urteilstheorie zurück, dergemäss bei Sinnestäuschungen das Urteil gewaltsam in die Kuppelung der Lokalisationskomplexe eingreifen sollen. Dafür bringenaber die Einzelbeobachtungen selbst mancherlei veues. Insbesondere tritt die Fallempfindung nur bei senkrechter Kopfhaltung auf, sie fehlt wenn die Kopfasche horizontal steht. Dies soll sich aus der besonderen Tätigkeit des Statolithenorgans erklären das beim Aufrechtstehen dauernd den Tonus der Muskulatur erhält. Beim senkrechten Fall wird die Spannung der Sinneshaare in dem Statolithenorgan aufge entspannt und damit jener Tonus der Muskulatur aufgehoben Beim Fall mit horizontaler Körperachse

dagegen bleibt der Statolith genau an seiner Steole und die Fallempfindung tritt nicht ein.

O. Klemm (Leipzig)

728. Bleyl, R., Die funktionelle Ermüdung des Gehörorgans *Arch. f. Ohren-Nasen und Kehlkopfheilkunde,* 1921, **108**, 191–197.

Nach den seit Urbantschitsch üblichen Methoden ist eine Ermüdung des Gehörorgans auch bei Ohrerkrankungen nachweisbar, falls nur die Schwrehörigkeit nicht allzuhochgradig ist. Da die Ermüdung am stärksten bei Neurasthenie und zerebralen Erschöpfungzuständen ist, soll sie als ein Ermüdungssympton der Hörzentren aufzufassen sein. Bei den zahlenmässigen Ermittelungen begnügt sich der Verf. damit die Verhältnisse der Hörzeiten für abklingende Stimmgabeln anzugeben, während doch die das eigentliche Mass abgebenden Schwellenamplituden erst mit Hilfe des Dämpfungsfaktors der jeweils benutzten Gabel aus jenen Hörzeiten abgeleitet werden müssen.

O. Klemm (Leipzig)

729. Brunner, H., u. Schnierer, J., Klinische Untersuchungen über Tonunterschiedsempfindlichkeit bei Normalen, Schwerhörigen u. Taubstummen. *Beitr. z. Anat. Physiol. Pathol. d. Ohres, d. Nase u. d. Halses,* 1922, **18**, 1–23.

Die Verfasserwenden zur Bestimmung der Tonunterschiedsempfindlichkeit ein der Methode der r u. f Fälle ähnliches Verfahren an, beschränken sich aber auf ein einziges Intervall von ¼ Ton. Sie finden, dass Erkrankungen des Gehörorgans, sowohl des schalleitenden wie des schallpercipierenden Apparates, die Unterschiedsempfindlichkeit, soweit sie nach dieser Methode bestimmt ist, nicht nachweisbar beeinflussen. Es ist zu bedauern, dass die Verfasser auf ihr interesantes Material nicht die zu genaueren Bestimmungen geeigneten Hilfsmittel der Psychophysik angewendet haben. Sie ziehen aus jenem Verhalten der Unterschiedsempfindlichkeit weitreichende Schlussfolgerungen zu Gunsten der Helmholtzschen Resonanzhypothese. Ihrer Meinung, dass der Tonhöhenvergleich als ein Urteilsvorgang nicht durch organische Schädigung des Gehörorgans, sondern erst durch funktionelle Erkrankung des Gehirns betroffen werde, ist vom Standpunkte einer psychologischen Akustik aus wohl zuzustimmen.

O. Klemm (Leipzig)

730. SCHORSCH, E., Die pädagogische Versorgung der Schwerhörigen. *Beitz. z. Anat. Physiol. Pathol. d. Ohres, d. Nase u. d. Halses,* 1922, **18**, 111–121.

Schildert den Schwerhörigen in seiner eigenartigen Isolierung von der sprechenden Umwelt, sodann die in Berlin getroffenen Einrichtungen; Schwerhörigenschulen u. Fortbildungsschulen für Schwerhörige mit einem gründlichen Absehutterricht. Das Pflegeamt für wissenschaftliche Weiterbildung der Schwerhörigen bildet hiezu eine wichtige Ergänzung. Es treibt auch Berufsberatung für Schwerhörige.

O. KLEMM (Leipzig)

731. WERBITZKY, W., Zur Frage von den schematischen und reduzierten Augen. *Klin. Monatsbl. f. Augenheilk.,* 1922, **68**, 588–598.

Das schematische Auge von Gullstrand muss von allen bisher konstruierten zweifellos als das beste anerkannt werden, hat allerdings den Nachteil, dass es 6 brechende Flächen aufweist. Dadurch wird die Berechnung sehr kompliziert, wie W. an einem Beispiel nachweist. Zur Erleichterung hat man von jeher zu den vereinfachten reduzierten Augen gegriffen, und es würde sich nun darum handeln, ein reduziertes Auge zu finden, das am besten den Ergebnissen des schematischen Auges Gullstrands entspricht. W. findet dafür folgende Konstanten: Brechungsindex 1, 4, Krümmungsradius der brechenden Fläche 6, 8, Krümmungsradius der Netzhautfläche 10, 2 mm.

KOELLNER (Würzburg)

732. JABLONSKY, W., Zur Vererbung der Myopie. *Klin. Monatsbl. f. Augenheilk.,* 1922, **68**, 560–573.

Für die hochgradige Kurzsichtigkeit ist die Erblichkeit sehr wahrscheinlich, wie sich an der Hand eines Stammbaums mit 4 Generationen zeigen lässt. Ein zweiter Stammbaum lässt erkennen, dass die hochgradige Myopie sich regressiv vererbt, übrigens zugleich mit einer auffallenden Bindung an das weibliche Geschlecht. J. will noch nicht entscheiden, ob diese Geschlechtsbindung sich häufiger findet. Die Anwendung der Weinberg'schen Methoden zeigen ferner, dass sich höchstwahrscheinlich die Myopie nach den Mendel'schen Regeln als monohybrides regressives Leiden vererbt.

KOELLNER (Würzburg)

733. Schioetz, E., Rotgrünblindheit als Erbeigenschaft. *Klin. Monatsbl. f. Augenheilk.*, 1922, **68**, 498–526.

Die Farbenblindheit vererbt sich ausnahmslos als regressiv geschlechtsgebundene Eigenschaft. Eine Ausnahme von dieser strengen Vererbungsregel hat S. weder selbst beobachten können, noch sind die in der Literatur als angebliche Ausnahmen veröffentlichten Fälle beweiskräftig. Die Arbeit ist mit zahlreichen Stammbäumen illustriert.

Koellner (Würzburg)

734. Ohm, Die klinische Beduetung des optischen Drehnystagmus. *Klin. Monatsbl. f. Augenheilk.*, 1922, **68**, 323–355.

Als optischen Drehnystagmus bezeichnet Ohm aus theoretischen Gründen den bekannten "Eisenbahnnystagmus," den er unter Registrierung der Augenbewegungen mittels Schreibhebels genauer untersucht hat. Von physiologischen Interesse ist hier eigentlich nur, dass auch hierbei ein sog. Nachnystagmus auftritt, indem nach Aufhören der Bewegung der Objekte, welche den Nystagmus auslösen, noch einige weitere gleichgerichtete Augenzuckungen auftreten, sowie dass sich auch auf diese Weise ein optischer rotatorischer Nystagmus auslösen lässt. Hinsichtlich der Genese entfernt sich O. mit seiner Ansicht weit von der bisher geltenden: er nimmt nämlich eine einheitliche Entstehung mit dem vestibulären an, weil sich die aufgenommenen Kurven ähneln.

Koellner (Würzburg)

735. Kobelt, J., Das Dauergedächtnis für absolute Tonhöhen. *Archiv. f. Musikwissenschaft*, 1920, **2**, 144–174.

In dieser zusammenfassenden Behandlung der vorhandenen Literatur, insbesondere der neueren, bringt der Verfasser zunächst eine Begriffsbestimmung des absoluten Gehörs. Weiterhin zeigt er dessen Abhängigkeit von der Tonhöhe, Tonfarbe, Tonstärke und Tondauer. Die Wurzeln des Gedächtnisses für Tonhöhen sieht er in der Lebendigkeit der Tonvorstellung, in der gesteigerten Aufmerksamkeit und in individuellen Faktoren physiologischer Art. Nach einer Darlegung der Entwicklung und der Arten des Gedächtnisses für absolute Tonhöhen geht der Verfasser noch auf die Bedeutung dieses Gedächtnisses für die allgemeine Musikalität ein; er nimmt an, das die beim Musikgenus vom Intervallsinn geleistete Hauptarbeit durch das Erkennen der absoluten Tonhöhe glücklich ergänzt und gefördert werde.

R. Wicke (Leipzig)

736. SCHÜNEMANN, G., Ueber die Beziehung der vergleichenden Musikwissenschaft zur Musikgeschichte. *Archiv. f. Musikwissenschaft*, 1920, **2**, 175–194.

Es werden vom Verfasser die Grundformen der Mehrstimmigkeit bei Naturvölkern und anderen Volksgemeinschaften des Ostens und ebenso des Westens nachgewiesen. Das Gebotene vermag als Material bei entwicklungspsychologischen Untersuchungen zu dienen.

R. WICKE (Leipzig)

737. LOBSIEN, M., Zeichnen und Sehen. *Zeits. f. angew. Psychol.*, 1922, **20**, 89–129.

Die Untersuchung nimmt die Zeichenvorgänge zum Gegenstand, die in erster Linie vom Gesichtssinn abhängig sind. Unter den Klassenplätzen erweisen sich die vom Lehrerpult aus links vorn befindlichen als der Objektbeobachtung am günstigsten. Die Teilung wagerechter, sowie kurzer Liniendistanzen ergibt geringere Fehlerwerte als die der Teilung senkrechter und längerer Distanzen. Sie zeigen im Gegensatz zu Punktdistanzen Altersfortschritt. Der Begabte ist den Unbegabten im Durschschnitt um das Doppelte überlegen. Das Gedächtnis für einzelne Punkt- und Liniendistanzen steht in keiner eindeutigen Beziehung zur begabung. Winkel, die kleiner sind als 20 Grad und solche, die grösser sind als 90 Grad, werden überschätzt. Nahezu genau werden die Winkel von 20, 90 und 180 Grad angegeben. Ein sehr grosser Teil der Schüler nimmt die perspektivische Täuschung garnicht wahr. Das perspektivische Sehen scheint von Veranlagung, absichtlichen Belehrungen und konstruktiven Darstellungsübungen abhängig zu sein. Die wesentlichste Bedingung für das Gedächtniszeichnen ist die günstige Aufmerksamkeitsrichtung. Sie darf weder einseitig fluktuierend, noch einseitig fixierend sein.

H. BOGEN (Berlin)

738. KROH, O., Subjektive optische Anschauungsbilder (s. o. A.-B.) bei Jugendlichen. *Zeits. f. pädag. Psychol.*, 1922, **23**, 40–51.

Individuen mit s. o. A.-B. sind imstande, dargebotene Objekte oder Bilder selbst nach kurzdauernder Betrachtung nicht nur vorzustellen, sondern sich mit wahrnehmungsgemässer Deutlichkeit zu vergegenwärtigen. Nach Zusammenstellung der wesentlichsten Ergebnisse der Forschungen des Marburger psychologischen In-

stituts über Charakter und Verbreitung der A.-B. bei Jugendlichen wird die pädagogische Beduetung der A.-B. erörtert. Die hohe Leistungsfähigkeit des Sinnengedächtnisses macht es zu einer wesentlichen Komponente beim Aufbau der Wahrnehmungswelt und des intellektuellen Lebens der Jugend. Bei der Betätigung der Anlage machen sich selektive Tendenzen geltend, die nicht jedem Eidetiker gestatten, von jeder Vorlage ein A.-B. zu erzeugen. Bei Eidetikern, die nur Schönes im A.-B. vergegenwärtigen können, spricht man von kalotropem Typus. Individuen, die nur von in ihrem Interessenkreis liegenden Gegenständen A.-B. zu erzeugen in der Lage sind, bezeichnet man als philotrop. Die Feststellung der Typenzugehörigkeit eines Schülers gibt Einblick in seine seelische Grundstruktur. Die eidetische Anlage drängt zum Ausdruck. Diese Erkenntnis schliesst die Forderung nach Freitätigkeit im Unterricht ein. Eidetiker eines bestimmten Typus sind plastisch in ihren Schilderungen und sehr zeichenfreudig. Besonders wertvoll erwies sich die Analyse des s. o. A.-B. auch für die Diagnose leicht psychopathischer Konstitutionen.

H. Bogen (Berlin)

739. Young, P. T., Series of Difference Tones from Tunable Bars. *Amer. J. of Psychol.*, 1922, **33**, 385–393.

A standard set of orchestra bells may be used to produce unusually clear and loud difference tones. By keeping a constant interval between the generators and by varying the generators themselves up and down the register, musical scales and simple melodies can be produced in the difference tones. A similar result may be produced with one generator constant, and the difference tones may be made to change in either the same or the opposite direction to the generators. Tunable bars, each differing from the next by a constant number of vibrations, can be used to demonstrate difference tones of the same pitch from generators of different frequencies, the lower limit of difference tones, and musical clangs made up of difference tones.

G. J. Rich (Pittsburgh)

740. Dimmick, F. L., A Note on Henning's Smell Series. *Amer. J. of Psychol.*, 1922, **33**, 423–425.

Seventy-five odors were classified by a number of observers in accordance with the schema of Henning's small prism. Stimuli

were found which demonstrated every corner, every edge (with one exception), and every surface of the small prism. The classifications did not fully agree with those given by Henning.

G. J. Rich (Pittsburgh)

741. Ladd-Franklin, C., Tetrachromatic Vision and the Development Theory of Vision. *Science,* 1922, **55**, 555–560.

Nonpsychological workers in colors have failed to realize that there are four "colors" in the spectrum, placing the number at seven, six, or three. The theory of Hering is incompatible with the facts of "matching by mixture" and of the König-Dieterici spectral distribution curves; while the theory of Helmholtz cannot be brought into accord with the fact that there are four chromatic constituents of the color-series. The development theory meets the difficulties of both, and in addition supplies an evolutionary account of color vision in full accord with the results of recent investigations in physical chemistry. The sensation of black may also be easily accounted for on this theory.

G. J. Rich (Pittsburgh)

4. FEELING AND EMOTION

742. Martin, A., Die Gefühlsbetonung von Farben und Farbenkombinationen. *Zeits. f. Kinderforschung,* 1921, **26**, 128–156.

Eine bestimmte, allgemein bevorzugte Lieblingsfarbe der Kinder hat sich nicht feststellen lassen; es liess sich nur eine Reihe von Wohlgefälligkeit aufstellen. Violett, Blau and Rot stehen vor Gelb, Grün and Braun. Die Grade der Gefühlsbetonung sind bei Kindern aus ungebildeten Ständen weniger differenziert als bei denen aus gebildeten. Die Mädchen ziehen im allgemeinen das Rot dem Blau vor, die Knaben das Blau dem Rot, wofür die Erklärung vielleicht in den die Farbempfindung belgeitenden Assoziationen zu suchen ist. Neuheit einer Farbe ruft leicht eine Gefühlserregung hervor. Vertrautheit einer Farbe begünstigt positive Gefühlsbetonung. Assoziationen treten häufig auf und üben bestimmende Wirkung aus, am stärksten bei Rot. Besonders starke Sättigung begünstigt positive Gefühlsbetonung, die subjektive Helligkeit zeigt keine Wirkung in dieser Richtung.

H. Bogen (Berlin)

743. Starr, H. E., The Hydrogen Ion Concentration of Mixed Saliva Considered as an Index of Fatigue and of Emotional Excitation, and Applied to a Study of the Metabolic Etiology of Stammering. *Amer. J. of Psychol.*, 1922, **33**, 394–418.

The study of the physiological as an index of the psychological may be extended to include the metabolic condition of the body, and the hydrogen ion concentration of the saliva taken as the most readily available means of ascertaining this condition. A chemical technique was elaborated and norms of concentration obtained for healthy individuals. Emotional excitement decreased and fatigue increased the hydrogen ion concentration of the mixed saliva. A definite positive correlation was found to exist between the hydrogen ion concentration (and carbon dioxide content) of the saliva and the carbon dioxide content of the alveolar air and of the venous blood. Applying the method to stammerers, it was found that the "sub-breathers" had a high hydrogen ion concentration and carbon dioxide content of the saliva, which remained practically unchanged under verbal goading intended to produce emotional excitement. On the other hand, "psychopathic" stammerers showed a low hydrogen ion concentration, which was further decreased under verbal goading. The "sub-breathers" were shown to have their organisms overloaded with carbon dioxide, which dulled their mental faculties, while the "psychopathic" stammerers discharge a disproportionate amount of energy in response to every stimulus.

G. J. Rich (Pittsburgh)

744. Carpenter, R., Laughter, A Glory in Sanity. *Amer. J. of Psychol.*, 1922, **33**, 419–422.

Laughter expresses an emotion due to the sudden flooding into consciousness of the subconsciously abiding pleasure in the power of judgment, occasioned by the swift overthrow of presented propositions that tend but fail to delude the judgment. To be comic, a proposition must be perceived as false and deceptive. The laughter then exults in being so sane that he cannot be deceived. All forms of humor exhibit the working of this formula.

G. J. Rich (Pittsburgh)

745. WASHBURN, M. F., MACDONALD, M. T., and VAN ALSTYNE, D., Voluntarily Controlled Likes and Dislikes of Color Combinations. *Amer. J. of Psychol.*, 1922, **33**, 426–428.

The observers were required to give judgments of the pleasantness or unpleasantness of pairs of colors, and then to attempt voluntarily to like the unpleasant and dislike the pleasant combinations. A change of affective judgment was accomplished in four-fifths of the observations, the extreme judgments being the most difficult to change. Repetition of the affective judgments after an interval of two months showed that changes in the direction of increased pleasantness were more likely to be lasting. The changes were effected by means of "imaginary content," the occurrence of associated ideas, and, occasionally, true compensation.

G. J. RICH (Pittsburgh)

746. CRAIG, W., A Note on Darwin's Work on The Expression of the Emotions in Man and Animals. *J. of Abnor. Psychol. and Social Psychol.*, 1922, **16**, 356–366.

The writer prefaces his article by pointing out the importance of expressive behavior to the expressing organism as well as the one that perceives the expressive signs. After having briefly presented the modern notions of emotion and emotional expression, he takes up those of Darwin. Mention is made of Darwin's Three Principles: (1) The Principle of Serviceable Associated Habits; (2) The Principle of Antithesis; (3) The Principle of Actions Due to the Constitution of the Nervous System. He limits his paper to a discussion of the first. He disagrees with Darwin, who is quoted as saying: "There are no grounds, as far as I can discover, for believing that any muscle has been developed or even modified exclusively for the sake of expression." It is pointed out how Darwin came to uphold such a thesis; that he and his coworkers wished "to convince the world of the truth of evolution," and to demonstrate how it had taken place. In closing the writer says: "He (Darwin) did not sufficiently grasp the fact that the expressions of the lower animals have the same sort of importance for them as our own means of communication have for us, and thus he failed to see that the basis of evolution of emotional expression in all mammals and birds is psychological."

D. A. MACFARLANE (Boston Psychopathic Hospital)

5. MOTOR PHENOMENA AND ACTION

747. WINKLER, H., Die Monotonie der Arbeit. Ein Beitrag zu dem Problem des psychischen Verhaltens bei gleichförmiger Arbeit. *Zeits. f. angew. Psychol.*, 1922, **20**, 46–88. Ferner in: *Schriften z. Psychol. d. Berufseignung u. d. Wirtschaftslebens*, Heft 19, 1922.

Die Ergebnisse sind aus graphischer Registrierung und Protokollierung von Aussagen der Versuchspersonen bei 1½ bis 8 stündiger Dauerarbeit an einem "Monoton" gewonnen worden. Die Monotonie ist abhängig von dem Grade der Erschwerung einer Aufnahme gleichartiger Eindrücke und von dem Masse der willkürliche Aktivität, die entgegen der Veranlagung aufgewendet werden muss. Die Personen unterscheiden sich nach dem Grade der Unterschätzung gleichartiger Eindrücke und der prozentualen Störungsschwankung, die untereinander umgekehrt proportional sind. Personen mit geringen Störungsschwankungen sind fähig, ihre Aufmerksamkeit ausser auf die mechanische Arbeit auch auf andere Psychische Leistungen zu verteilen. Sie sind "frei von der Arbeit," während Personen mit starken Störungsschwankungen in hohem Masse "an die Arbeit gebunden" sind. Die Kurve der Ergographenleistung zeigt in den Hauptzügen Übereinstimmung mit der Monoton-Dauer-Kurve. Diese gibt unmittelbaren Aufschluss über die Psychomotorische Arbeitfähigkeit, unabhängig von der körberlich-muskulären Veranlagung des Individuums.

H. BOGEN (Berlin)

748. BOGEN, H., Zur Frage der Rangreihenkonstanz bei Begabungs- und Eignungsprüfungen. *Zeits. f. angew. Psychol.*, 1922, **20**, 153–191.

Die Probe auf die Konstanz der bei Testprüfungen zu gewinnenden Rangreihen ist zum integrierenden Bestandteil jeder Eichungsuntersuchung zu machen. Bei für rein wissenschaftliche Zwecke angestellten Konstanzuntersuchungen ist die Struktur der psychischen Leistung in Beziehung zu setzen zum Ergebnis der Konstanzprobe. In der vorliegenden Arbeit sind Aufgaben zur Prüfung des induktiven Denkens, des sinnvollen Behaltens und der Sicherheit und Ruhe der Hand-Armbewegung nach obigen Grundsätzen bearbeitet worden. Der Schwierigkeitsgrad einer Aufgabe aus dem Bereich induktiven Denkens lässt einen Schluss dahingehend zu,

dass der Reangreihenzerfall um so eher zu erwarten ist, je schwieriger sie ist, d. h. je reicher die Möglichkeit zur Hypothsenbildung ist während des Denkablaufs. Starke Durchdringung korrelativ wenig auf einander bezogener seelischer Funktionen in einer Aufgabe scheint die prognostische Zuverlässigkeit herabzusetzen. In den Versuchen zur Bewegungsgeschicklichkeit erwies sich eine Probe mit Ausschaltung des individuellen Arbeittempos als ausreichend konstant. Bei freier Wahl des Arbeittempos zeigt sich die nach dem Leistungseffekt aufgestellte Rangreihe trotz intraindividuell konstant bleibender Arbeitgeschwindigkeit als nicht zuverlässig.

H. Bogen (Berlin)

749. Szymanski, J. S., Aktivität und Ruhe bei den Menschen. *Zeits. f. angew. Psychol.*, 1922, **20**, 192–225.

Untersucht die Periodizität und die Periodendauer der Zustände hoher und herabgesetzter Aktivität sowie die der relativen und absoluten Ruhe im Tagesverlauf des Menschen. Die Versuchspersonen hatten dabei in möglichst indifferentem Zustand 24 Stunden im Bett zu verbleiben. Graphische Registrierung der Motivität (psychophysische Parallelerscheinung zu den ineren Erlebnissen des Leistenkönnens verhalf zu "Aktogrammen" der Versuchspersonen. In Tagescyklus sind vier Rhythmen feststellbar: eine grosse Tagesperiode der Aktivität; zwei Hauptperioden erhöhter Aktivität während der Vormittags- resp. Nachmittagsstunden; etwa 10 Stundenperioden kleiner Schwankungen der Aktivität während der Tagesperiode; einige hundert und noch mehr Minutenperioden, d. h. jene kleinsten Zeitintervalle, während welcher ein Impuls zur Bewegung sich notwendigerweise geltend macht. Die Perioden höchster Aktivität dauern im ganzen 8 Stunden und stehen in ziemlich konstantem Verhältnis zu den Perioden der herabgesetzten Beweglichkeit, in völlig konstantem zur grossen Tagesperiode. Die Versuchsmethode bietet die Möglichkeit zu wissenschaftlicher Bearbeitung der Abgrenzung des Arbeittages. Die Periodenverteilung des Säuglings weicht völlig ab von der des Erwachsenen. Die Tatsache der Polyphasie des Säuglings ist in Zusammenhang zu bringen mit der Präponderanz der taktilen und gustatorischen Sinnestätigkeit und entspricht dem Verhalten entsprechenden Tiergruppen im Gegensatz zu dem optisch eingestellten Sinnesleben des Erwachsenen und entsprechender Tiergruppen.

H. Bogen (Berlin)

750. SCHULTE, R. W., Anlaufstrecke, Geschwindigkeit und Sprungleistung im Weitsprung. *Psychol. Mitteilungen,* 1922, **3**, 24–25.

Experimentell wird nachgewiesen, dass der höchsten Anlaufgeschwindigkeit die beste Sprungleistung entspricht. Die maximale Laufgeschwindigkeit ist abhängigvon der individuell angepassten Wahl der Anlaufstrecke. Versuche mit einem Langstreckenläufer zeigten, dass derselbe infolge seiner Lauftechnik trotz bedeutender Anlaufgeschwindigkeit nicht für die Weite des Sprungs garantieren kann. Technik, Stil und Training bedingen so eine tiefgreifende Wirkung. H. BOGEN (Berlin)

751. WAGNER-JAUREGG, J., Die Arbeitsscheu. *Arch. f. Kriminol.,* 1922, **74**, 104–119.

Arbeitsscheu ist der natürliche und angeborene Zustand, der aber normalerweise überwunden wird: die mit der Arbeit verbundene Unlust (Ermüdung) wird überwunden zum Zwecke der Erringung künftiger Lustgefühle (Ehrgeiz, Eigentumsbegriff, Unabhängigkeit u. dgl.). Es gibt aber Menschen, "die, sei es infolge ungüstiger Anlagen, sei es infolge fehlerhafter Erziehung oder beider Schädlichkeiten arbeitsunlustig geblieben sind." Der Charakterfehler der Arbeitsscheu ist in hohem Masse erblich. Die Arbeitsscheuen sind zum Teil schwachsinnig (besonders Landstreicher), z. T. moralisch defekt, z. T. konstitutionell neurasthenisch, z. T. hebephrenisch. Schilderung verschiedener Formen des Auftretens der Arbeitsscheu, in der Schule und im Beruf. Einfluss der Arbeitsscheu auf die Berufswahl. Soziale Folgen der Arbeitsscheu: Rentnertum, Bettelei, Krankheitssimulation, Prostitution, Verbrechen.—Psychologische Analyse des "Stehltriebes."—Wenn Arbeitsscheu mit "Wandertrieb" zusammenfällt, so entsteht Vagabundentum, in Verbindung mit Phantasie und schauspielerie schem Talent Hochstaplertum.—Besserung der Arbeitsscheu durch Arbeitszwang: unbegrenzte Haftdauer als Sicherungsmassnahme und bedingte Entlassung. O. LIPMANN (Berlin)

752. TOWNE, B. M., An Individual Curve of Learning: a Study in Typewriting. *J. of Exper. Psychol.,* 1922, **5**, 79–92.

The present study adds one more datum to the array of results from the psychology of learning. The writer presents a curve representative of her own progress in learning to typewrite, and

makes use of her own introspective reports as explanatory material for the individualistic form of the curve. Only one short pleateau in the curve is a genuine plateau; the others are explicable in terms of lack of interest, fatigue, distraction, novelty or difficulty of material, and the like.

C. C. PRATT (Harvard)

753. CASON, H., The Conditioned Pupillary Reaction. *J. of Exper. Psychol.*, 1922, **5**, 108–146.

The criticism may be brought against much of the work on conditioned reflexes that voluntary factors have doubtless cut across the mechanisms under investigation. To avoid this complication the present experiment was made upon the pupillary reflex, which in a strict sense is not subject to voluntary control. The purpose of the experiment was to determine whether the change in size of the pupil caused by a change in the intensity of light thrown on the retina could not be conditioned eventually to the sound of a bell.

A special apparatus was employed which served to measure the changes in the size of the pupil and to control the intensity of the visual stimulus. Two procedures were followed during the training period. In one procedure the light was turned off and the sound of the bell was present while the *dilatation* of the pupil was in progress; in the other procedure the light was turned on and the bell sounded during a *contraction* of the pupil. The training series were completed in one continuous sitting of 3 hours and 20 minutes. Nine subjects took part in the experiment.

For both procedures conclusive evidence was forthcoming that the pupillary reflex had become conditioned to the auditory stimulus, although the evidence was more positive for contraction than for dilatation. The average amount of conditioned contraction was 0.527 mm., while the conditioned dilatation averaged 0.114 mm. Further experiments indicated that a conditioned reflex of the pupil probably could not be established *before* the change in the size of the pupil, and certainly not *after* the change; but that it could be readily established *during* the change in size. Trials with the sound of a bell and the buzzing sound of a telephone receiver furnished positive evidence that the reflex was conditioned to a specific stimulus and not to any stimulus affecting the nervous system at the time.

C. C. PRATT (Harvard)

754. MARTIN, A. H., An Experimental Study of the Factors and Types of Voluntary Choice. *Archiv. of Psychol.*, No. 51, 1922, pp. 115.

The monograph is a report of an investigation, the aims of which were (1) to verify the previous work done upon voluntary choice and (2) to examine the after period by interference with choice by any available methods.

In the first series of experiments the subject was asked during the fore period to imagine himself in a certain predicament. During the main period he was to consider two alternatives in order to solve the dilemma and to make a choice between them. Then he was asked to give full introspections. A certain evaluative judgment of the subject's confidence in his choice and its degree of seriousness and difficulty were also obtained. For some situations the subject was required to "reconsider his decision, with a view to its reversal." Further introspections were recorded and the degree of possibility of reversal noted. A second series of experiments was conducted wherein the reagent was required to choose between two odors. The first series consisted of problems containing a situation and alternatives that offered a solution of the situation. There were thirty "situations."

The results show that the experimental process of choice may be said to begin with the acceptance of the task or *Aufgabe* in the fore period. In the main period there is more detailed process of exploration. These processes of tentative trying out are accompanied by kinaesthetic and organic processes which tend to be suspended at the moment of acceptance and to cease with the actual decision.

The author concludes: Three differentiated types of decision are apparent—the Preference, the Conflict, and the Indifference type, the Preference type being characteristic and most numerous. The Preference type proceeds smoothly, implies a rich subjective experience and is finally accompanied by a large measure of the self-assertive tendency. The Conflict type, vacillating in its character, also implies a rich fund of associations, but appears somewhat lacking in regard to the degree of self-assertion that is present. The Indifference type is wanting in associative material, its process is apathetic, and it ranks lowest in the strength of the final self-assertive tendency. The possibility of reverse is least in the case of the Preference type, but greatest in the Indifference type.

E. MULHALL ACHILLES (Columbia)

755. Galloway, T. W., Chemistry and Character. *J. of Educ. Psychol.*, 1922, **13**, 303–306.

Two books on ductless glands are reviewed: "The Endocrines," by S. W. Bandler, and "The Glands Regulating Personality," by Louis Berman. The reviewer sought implications of the relation of internal secretions to personal education and character. He concludes that educational methods may still safely assume the central nervous system as the foundation structure in the development of the individual, although no unimportant place may be eventually given to the endocrine mechanisms.

A. T. Poffenberger (Columbia)

6. ATTENTION, MEMORY AND THOUGHT

756. Waldberg, L., Zur Wirkung der Affekte auf die Erinnerungsfähigkeit bei gesunden Erwachsenen, bei Kindern und Geisteskranken. *Allgemeine Zeits. f. Psychiat. u. psychisch-gerichtliche Medizin*, 1921, **77**, 29–57.

80 Versuchspersonen wurden in Intervallen von 10 Sekunden 21 Wörter zugerufen, die teils dem Sexualleben, teils dem sozialen Leben (z.B. "Polizei," "Arzt"), teils dem religiösen Gebiete, teils dem Familienleben (z.B. "Schwester") entnommen waren; ausserdem wurden einzelne Wörter gewahlt, die in diese Gruppierung nicht hineinpassen, aber im Allgemeinen leicht gefuhlsbetont sind (z.B. "Feuer"). Nachher hatte die Versuchsperson sofort die behaltenen Wörter zu reproduzieren und über alle Wörter ihre inneren Erlebnisse mitzuteilen. Das Verfahren war unwissentlich, insofern die Versuchsperson nicht wusste, dass sie die Wörter später zu reproduzieren hätte. Ergebnisse: Die Erinnerung beschränkte sich fast ganz auf Wörter, die gefühlsbetonte Komplexe anklingen liessen, und zwar kamen fast ausnahmlos *Unlust*gefühle zur Wirkung. Bei Normalen bestand ausserdem eine Tendenz: die Wörter in der Reihenfolge der Darbietung zu reproduzieren; in Fällen, wo gefühlsbetonte Vorstellungen dominieren, wird die Reihe durch ein Wort durchbrochen, welches diese Vorstellung angeregt hat ("Komplexwort"). Bei Kindern ist die Reihentendenz um so weniger ausgesprochen, je jünger sie sind; bei den jüngsten kann sie ganz fehlen. Die übrigen Ergebnisse beziehen sich auf Schizo-

phrene und Epileptiker. Die früheren Arbeiten auf diesem Gebiet sind fast garnicht berücksichtigt geblieben.

TH. ZIEHEN (Halle)

757. STERN, E., Über bewahrendes und verarbeitendes Gedächtnisverhalten. *Zeits. f. angew. Psychol.*, 1922, **20**, 1–45.

Die Untersuchung zielt darauf ab, einen differentiell-psychologischen Unterschied in der Struktur des Gedächtnisverhaltens herauszuarbeiten. Es sollen nicht irgendwelche Gesetze und Typen herausgestellt werden, sondern es kommt darauf an, den der Phänomenbeobachtung vorliegenden Gedächtnisvorgang durch Eindringen in seine Struktur so weit als möglich zurück zu verstehen. Die sensorischen Typen reichen nicht aus, um die wesentlichen Gedächtnisphänomene zu begreifen. Das Gedächtnis hat einmal die Funktion, gehabte Erlebnisse verfügungsbereit zu halten, zum andern die, seine Inhalte unter bestimmten Einstellungen zu bearbeiten. Wo das erste Verhalten die vorherrschende Rolle spielt, sprechen wir von bewahrendem Verhalten, wo die zweite Funktion im Vordergrunde steht, haben wir es mit verarbeitendem Verhalten zu tun. An Versuchen mit Erwachsenen wird die Struktur dieser Verhaltensweisen auch in seiner Beziehung zu den sensorischen Typen aufgezeigt.

H. BOGEN (Berlin)

758. VAËRTING, M., Aufmerksamkeit höherer Ordnung und ihre Beziehung zum Begabungsproblem. *Zeits. f. pädag. Psychol.*, 1922, **23**, 197–207.

Beim psychologischen Vorgang der Konzentration ist zu achten (1) auf den psychologischen Antrieb, welcher als vorherrschender Faktor die Aufmerksamkeit spannt, (2) auf das Objekt oder die Tätigkeit, auf welche sich die Aufmerksamkeit richtet. Dementsprechend ergeben sich vier Formen der Konzentration: (1) auf vorwiegend mechanische Tätigkeit mit dem Willen als Hauptantreib gerichtet, (2) auf Tätigkeit höherer Art vorwiegend willentlich gespannt, (3) auf die mechanische Tätigkeit aus unmittelbarem Interesse gerichtet, (4) Konzentration in der höheren geistigen Sphäre nur aus dem Interesse heraus. Nur die vierte Form ist als Aufmerksamkeit höherer Ordnung anzusprechen. Sie ist unbedingte Voraussetzung zur Auswirkung der hohen Begabung. Sie nur ermöglicht das gänzliche Aufgehen des Individuums in seiner

Tätigkeit und damit die Steigerung der Leistung über die alltägliche Norm hinaus. Die niederen Stufen der Konzentration sind der Auswirkung der Begabung hinderlich, denn in einem Individuum können nicht beide Konzentrationsarten, die vom Willen und vom Interesse getragene sich gleichmässig nebeneinander entfalten. Die in der bisherigen Begabungsprüfung verwendeten Aufmerksamkeitsproben sind, da sie die Konzentration niederer Ordnung prüfen, als nicht zweckentsprechend abzulehnen.

H. Bogen (Berlin)

759. Mabai, S., The Effects of Repetitions upon Retention. *J. of Exper. Psychol.*, 1922, **5**, 147–151.

The purpose of the present study was to determine whether the repetitions in memorizing nonsense syllables between 8, 16, 24, 32, 42, 55, and 64, which Ebbinghaus employed in his work on memory, would yield a learning curve which approximates a straight line or not. The materials consisted of series of 12 nonsense syllables presented to the subject 2, 4, 6, 8, and 10 times. The results indicate that the number of readings saved in relearning for each successive number of repetitions is nearly constant, and that the curve of learning, therefore, for a moderate as well as a large number of repetitions is almost a straight line.

C. C. Pratt (Harvard)

760. English, H. B., An Experimental Study of Certain Initial Stages of the Process of Abstraction. *Amer. J. of Psychol.*, 1922, **33**, 305–350.

This investigation aimed to find the impulse which leads one to react to a situation by making an abstraction. The observers were required to describe the manner in which meaning came to nonsense syllables which were presented together with a series of stimuli having a particular characteristic common to all, but were not instructed to abstract or to define the syllables. Abstraction was found to begin either with analysis or with the conceptual assimilation of the presentation, depending upon the presence or absence in consciousness of appropriate mental categories for total or partial assimilation. The cues that initiated analysis were preferential selection, through the operation of attention and memory, of certain parts of the presented material, the essentially analytic means of communication, or a deliberate and reflective intention to analyze. Conceptuali-

zation was initiated by apperception in terms of other sense modalities, through emphasis of part of the primary data, or by the appearance in consciousness of the class name. The essential element in abstraction was a definite, though perhaps marginal, intention to consider a definite quality in isolation from any of its particular relations. This attitude was aroused by instructions, by analogy to past experience, by reflective thought about the situation, or by certain intellectual needs. This attitude must be added to associative abstraction, as also to analysis and conceptualization, to have a full-fledged process of abstraction.

G. J. Rich (Pittsburgh)

761. Titchener, E. B., A Note on Wundt's Doctrine of Creative Synthesis. *Amer. J. of Psychol.*, 1922, **33**, 351–360.

The doctrine of creative synthesis illustrates, in the context of space-perception, Wundt's psychological development as well as his systematic procedure. The first account of this doctrine, in the *Beiträge,* is purely logical and explains nothing of the problem of space-perception. In a restatement, appearing in 1867, Wundt took the first step toward emancipation from logic. Only in the *Physiologische Psychologie* was the theory made a truly psychological one.

G. J. Rich (Pittsburgh)

762. Wheeler, R. H. and Cutsforth, T. D., Synaesthesia and Meaning. *Amer. J. of Psychol.*, 1922, **33**, 361–384.

Experiments upon a blind synaesthetic subject are reported. In them, he was required to recognize Braille letters touched singly, words in series of nonsense syllables auditorily presented, and words in Braille exposed tachistiscopically. In all these cases, the recognition was invariably accompanied by synaesthetic visual imagery which formed an integral part of the perception and carried the meaning of it. A blind asynaesthetic subject, used as a check, reported tactual or vocal-motor imagery which behaved as did the visual imagery of the first subject. In the synaesthetic subject, the visual (synaesthetic) imagery constituted the context for meaning, "labeling" or "interpreting" the "object" and making it meaningful.

G. J. Rich (Pittsburgh)

7. SOCIAL FUNCTIONS OF THE INDIVIDUAL

763. Buehler, C., Die Aufgaben der Aesthetik. *Kant-Studien,* 1921, **26**, 403–415.

Diese geistreiche Antrittsvorlesung führt—anknüpfend an einen Aufsatz W. Diltey's (Deutsche Rundschau, Bd. 72, 1892)—die historische Betrachtung bis zu der Wirrnis moderner ästhetischer Strömungen. Die prinzipiellen Fragen nach Gegenstand, Aufgabe und Methode führen schlieplich zu der Trennung von Kunstwissenschaft und reiner Aesthetik. Die eine umfasst die Kunstpsychologie —die Analyse des Kunstschaffens, des Kunstgeniessens und der Kunstgestalt—und darauf aufbauend ein normatives System der Kunstwerte auf Grund allgemeiner überzeitlicher Strukturforderungen—analog den Wölfflin'schen "Grundbegriffen"; die Aesthetik baut auf einer Analyse der ästhetischen Erlebnisweisen in Natur und Kunst eine ästhetische Typenlehre auf.

Zuletzt wird die empirische Forschung als grundlegend für den philosophischen Aufbau betont.

B. Klopfer (München)

764. Tumarkin, A. Wie ist Psychologie als Wissenschaft möglich. *Kant-Studien,* 1921, **26**, 390–402.

Ausgangspunkt für die Problemstellung ist die Frage nach der Erkenntnis des Psychischen, gemäss der Eigenart seiner Gegebenheit; Ziel und Inhalt der Abhandlung bildet die Rechtfertigung einer *philosophisch* orientierten Psychologie der seelischen Sinnzusammenhänge (im Sinne Eduard Sprangers). Das Varhandensein objektiver Aufgaben, des als Sweckzusammenhang das individuelle Leben bestimmenden allgemeinen Kulturzusammenhanges, erhebt die Methode des *Verstehens* dieser Sinnzusammenhänge über "die wunderbare aber unverantwortliche Kunst der Einfühlung" eines W. Diltey hinaus; andererseits macht die Eigenart der psychischen Zusammenhänge ihre Einordnung in den allgemeinen Kausalzusammenhang des Naturgeschens unmöglich, da selbst den tatsächlich vorhandenen psychischen Kausalzusammenhängen ausserzeitliche Zusammenhänge zugrunde liegen—abgesehen von der Unmöglichkeit sie exakt mathematisch zu erforschen. "Das Seelenleben ist Sinnsuchen"—in diesen Worten spiegelt sich die psychologische Grundeinstellung der Verfasserin.

B. Klopfer (München)

765. LIPMANN, O., Wirtschaftspsychologie und psychologische Berufsberatung. 2. Auflage *Schriften zur Psychologie der Berufseignung und des Wirtschaftslebens Nr. 1.* 1921, S. 38.

Die Schrift will eine Einführung in die Probleme und in die Literatur sein. Die Einzelprobleme werden unter folgende Gesichtspunkte gruppiert: 1. Anpassung des Arbeitsproduktes und der Betriebseinrichtungen an die allgemeinen und besonderen Eigenschaften des Konsumenten; 2. Anpassung der Betriebseinrichtungen an die Eigenschaften des Arbeiters; 3. Anpassung des Arbeiters an die besonderen Erfordernisse der Produktion. Zu dem zweiten Punkt werden die grundsätzlichen Unterschiede zwischen Taylorismus und wirtschaftspsychologischer Einstellung besonders herausgearbeitet. Der dritte Teil grenzt die Berufsauslese (selection) und Berufszuweisung (guidance) nach ihren Zielen und Methoden ab. Zu der für die letztere besonders wichtigen Systematik der Berufe werden Einteilungsprinzipien vorgeschlagen. Angefügt ist ein Schema für die Beschreibung einer Eignungsfestellung, ferner ein Anhang über die Berechnung kombinierter Wertzahlen bei Eignungsprüfungen.

H. BOGEN (Berlin)

766. FRIEDRICH, A., Die Einstellungsprüfung der Schlosser- und Dreherlehrlinge innerhalb der Friedrich Krupp A.- G.- Essen. *Praktische Psychol.,* 1922, **3**, 159–166.

Die Prüfung erstrebt neben der Feststellung der individuellen Eigenart der Bewerber ihre Typengliederung. Die grossen Gebiete, unter die sich die zahlreichen Enzelproben ordnen, sind Vorstellung, Gedächtnis, Aufmerksamkeit und Sinnestüchtigkeit. Besonderer Wert ist auf die Erkennung der technisch-konstructiven Kombinationsfähigkeitgelegt worden. Die Bewertung berücksichtigt sowohl die Güte als auch das Tempo der Prüfleistungen. Auf die Errechnung eines Gesamtrangplatzes wird verzichtet. Die Einstellung der Bewerber erfolgt unterBerücksichtigung des psychischen Profils in die den Anlagen entsprechenden Abteilungen des Werkes.

H. BOGEN (Berlin)

767. BAUMGARTEN, F., Die Psychotechnik im Versicherungswesen. *Praktische Psychol.,* 1922, **3**, 167–178.

Auf Grund einer eingehenden Analyse an Praktikern im Versicherungsdienst—Agenten und Regulierungsbeamten—werden folgende

Ergebnisse gewonnen: Der Beruf des Agenten galt bisher als ein ganz freier, für dessen Ausübung keine Regeln vorgeschrieben waren und in welchem die zweckmässigen Handlungen auf Instinkt und Intuition beruhen sollten. Die Berufsanalyse zeigte jedoch, dass auch in diesem freien Berufe man auf Grund der persönlichen Erfahrungen zu gewissen Regeln und Methoden gekommen ist. Bei der rein praktischen Aufgabe der Auslese ist zu fragen, inwiefern besitzt ein erfolgreicher Versicherungsagent und Regulierungsbeamter einen hohen Grad der Sensibilität, sind seine Schwellenwerte für Wahrnehmungen, seine Reaktionszeit, die Fähigkeit zu Schlussfolgerungen auf Grund feiner Wahrnehmungen als über der Norm liegend amzusprechen.

H. Bogen (Berlin)

768. Magor, F., Das religiöse Leben des Industriekindes. *Pharus.*, 1922, **13**, 141-150.

Beleuchtet die psychologischen Schwierigkeiten religiöser Beeinflussung beim Industriekinde, dessen Stellung zwischen politischer Anschauung und verborgen nachwirkender Nützlichkeitsreligion im Elternhause die Eigeneinstellung zu religiösen Fragen erschwert oder völlig unterbindet.

H. Bogen (Berlin)

769. Burkhardt, H., Psychische Ursachen des Stotterns. *Zeits. f. pädag. Psychol.*, 1922, **23**, 207–211.

Zusammenstellung der vorliegenden Theorien über die Rolle von Gefühl, Willen und Intellekt in den Ursachfaktoren des Stotterns.

H. Bogen (Berlin)

770. Piorkowski, C., Sinnfälligkeit und Fehlassoziationen bei Inseraten und Plakaten. *Praktische Psychol.*, 1922, **3**, 141–146.

Begutachtet eine Reihe von Plakaten auf Grund von tachistoskopischen Überprüfungen derselben, wobei sich für einige ergibt, dass sie nicht die Erinnerung an das gewollte Produkt auslösen, sondern zu Fehlassoziationen Anlass geben. Die Ursachen liegen in verfehlter Wahl des sinnfälligsten Plakatteiles, in widersinnigen Beziehungen der Bildteile und in unzweckmässiger Formgestaltung der Buchstaben. An einer anderen Reihe von Plakaten und Inseraten wird ihre zweckmässige Gestaltung verdeutlicht.

H. Bogen (Berlin)

771. WAGNER, J., Ueber wissenschaftliche Begabung. *Pädag. Warte*, 1921, **28**, 1043–1046.

Unter den arbeitenden Wissenschaftlern hat man je nach dem Material, das verarbeitet wird, und nach der Art, wie es bearbeitet wird, typische Unterschiede zu beachten. Die einen verarbeiten in der Hauptsache ein durch äussere Sinneswahrnehmung gegebenes Material, die andern vorwiegend innere Wahrnehmungen und Erlebnisse logischer, ästhetischer oder ethischer Art. In der andern erwähnten Richtung lassen sich die Wissenschaftler scheiden in vorwiegend logisch und in vorwiegend phantasiemässig verarbeitende Individuen. Diesen mehr die Unterschiedung gebenden Eigenschaften schliessen sich die Eigenschaften und Funktionen an, die allen gemeinsam sind: Problembewusstsein—im Schüler erkennbar an seinem Frage "instinkt"—Verfügenkönnen über die geistige Vergangenheit, kategoriale Bearbeitung der jeweilig gegebenen Materie, Kombinationsfähigkeit, Kritikfähigkeit und Veraussetzungslosigkeit. An moralischen Eigenschaften ist in erster Linie vorausetzung für sachgemässe wissenschaftliche Betätigung das völlige Zurücktreten der eigenen Person gegenüber den Wahrheitsforderungen der Wissenschaft.

H. BOGEN (Berlin)

772. SCHÖNEBECK, E., Die Begabten im deutschen Unterricht. *Praktische Psychol.*, 1922, **3**, 223–230.

Beim Lesen grösserer Schriftwerke in den Bagabtenklassen wurde der Unterricht auf der Synthese aufgebauf, d. h. auf der Gesamterfassung des Zusammenhanges, des Gehaltes, der Charaktere. Die Schüler kamen dadurch zu bedeutend umfrangreicherer und mit grösserem Verständnis gepflogener Lektüre als die üblichen Normalklassen. Die Folge dieser Erweiterung des literarischen Gesichtskreises war eine nicht vermutete Steigerung der freiwilligen Beschäftigung mit Schriftwerken und literarischen Problemen. "Der geistige Hunger der Begabten und ein oft über ihre Jahre hinausgehendes Verständnis führt sie nicht nur zu vielseitiger Lektüre, zu einer staunenswerten Fülle von Kenntnissen, die sie sich von selbst auf dem Gebiete ihrer Privatneigungen angeeignet haben, sondern auch zu einer mehr selbstschöpferischen Tätigkeit." Zwei Betätigungsfelder gelten dafür besonders: Vorträge und Aufsätze, mündliche und schriftliche Produktion. Beispiele von Arbeiten

von Schülern verschiedenen Begabungsgrades werden gegenübergestellt.

H. Bogen (Berlin)

773. Weber, W., Die psychologische Analyse der Berufe. *Psychol. Mitteilungen,* 1922, **3**, 33–44.

Verf. stellt Untersuchungen, die bisher zur Berufsanalyse gelegentlich psychotechnischer Eignungsprüfungen gemacht worden sind zusammen und versucht so "Eigenschaftsschemata" der verschiedenen höheren und mittleren Berufe zu gewinnen, was besonders schwer für die höheren Berufe ist, da sie bisher am wenigsten systematisch behandelt worden sind.

H. Bogen (Berlin)

774. Clark, R. S., An Experimental Study of Silent Reading. *Arch. of Psychology,* No. 48, 1922.

"Silent thinking" is used throughout the report to describe processes carried on by the mind in its attempt to reach new conclusions which are controlled in their development by the demands of a problematic situation. Subjects were asked to solve problems without consciously making use of any explicit form of behavior. The value of the solution was disregarded, anything new to the subject was accepted as a solution. These processes were submitted to experimentation and studied from the psychological and physiological viewpoints.

In this investigation every means to arouse imagery was used. Problems were given which were likely to require for their solution images in the various sense fields. The subjects were asked to give an account of the mental processes which occurred between the time of presentation of the problem and the moment at which the subject was aware of an original conclusion. The experiment was carried on in a dark room lighted by but one bulb in the center, all other distracting objects having been removed from sight. A continuously recording kymograph was used. The time in fifths of a second was given by means of a vibrating reed and recorded by one of the needles. A second needle was connected with a key on the arm of the subject's chair while the third needle recorded the taps of the experimenter's key. As soon as the problem was given to the subject, objective records were taken on the kymograph during the thinking. Nine questions were asked each subject and no

others. An attempt was made to determine the individual differences in mental images. Four sittings followed, five problems being solved by each subject in each sitting. In Sitting I the kymographic record included (*a*) the time of the thinking in fifths of a second, (*b*) a record of the movements made by the subject during the thinking. Sitting II was similar to Sitting I with the exception that the subject was given the added instructions to press the key on the arm of the chair whenever he was conscious of the presence of imagery, releasing it when the imagery disappeared. The kymographic record included (*a*), (*b*), and also (*c*), the presence and absence of imagery occurring throughout. The kymographic record was the same for Sitting III, but the experimenter attempted to determine more exactly the amount of movement by pressing her key whenever she observed any movement made by the subject. Throughout Sitting IV various distractions, visual, auditory, verbal and hand-motor, were introduced during the thinking. This was done in order to learn, if possible, the connection existing between imagery and movement. Sitting V was given in the laboratory of the Neurological Department, School of Physicians and Surgeons. The subject was asked to solve problems while records of his respiration, both thoracic and abdominal, the volume changes of his arm, the horizontal and vertical movements of his larynx and the movements of his tongue were being simultaneously made upon the kymograph.

Some of the conclusions drawn are: Silent thinking may be carried on in very short periods of time, average for 150 reactions was 50.7 seconds. It may be accompanied by a consciousness of concrete imagery without any consciousness of verbal elements, or it may be accompanied by a consciousness of verbal elements independent of concrete imagery. These extremes are not frequent for thinking is usually accompanied by a consciousness of both concrete imagery and verbal elements. In general, the more rapid the thinking, the more frequent are these details in consciousness. This consciousness of concrete and verbal details accompanies but part of thinking; the remainder is imageless consciousness, independent of both concrete imagery and verbal elements. This imageless consciousness intervenes between periods of imagery. An individual is quiet when he is actually thinking. Throughout thinking, slight vasomotor and respiratory changes take place. The volume of the arm shows a slight tendency to increase gradually until the novel

conclusion is reached. The rate of heart-beat shows a slight increase at the beginning of thinking and then alternately increases and decreases until the conclusion is reached. Respiration tends to be more superficial and rapid after the problem is presented, becoming more regular as the solution is being reached. Thinking is a matter of association and, as this is a physiological process, it takes care of itself largely. E. MULHALL ACHILLES (Columbia)

8. SPECIAL MENTAL CONDITIONS

775. VAERTING, M., Physiologische Ursachen geistiger Hoechstleistungen bei Mann und Weib. *Abhand. a. d. Gebiete d. Sexualforschung,* 1922, **4**, S. 23.

Die Abhandlung beschäftigt sich damit, festzustellen, von welchen physiologischen Faktoren die schöpferische Leistungsfähigkeit von Mann und Frau abhängt. Der Erforschung dieser Faktoren scheint dem Verfasser ausser einer Fortführung unserer theoretischen Kenntnis hohe praktische Bedeutung zuzukommen, da dadurch die Möglichkeit näher gerückt wird, zu einer Hygiene und Oekonomie der produktiven Arbeit zu schreiten. Die schöpferische Tätigkeit ist keine Konstante, sondern weist erhebliche Schwankungen auf, wie die tägliche Erfahrung zeigt. Sind diese Schwankungen nun regellos oder lassen sie sich unter ein Gesetz bringen? Verfasser ist der Ansicht, dass diese Leistungsschwankungen von sexuellen Schwankungen abhängen. Ein Maximum der Leistungsfähigkeit korrespondiert bei Mann und Weib mit einem Minimum der Libido, die ihrerseits wieder als Wirkung der inneren Sekretion und zwar bei der Frau der Sekretion des corpus luteum zu betrachten ist, während beim Manne als Organ dieser Sekretion wahrscheinlich die reifenden Keimzellen selbst anzusehen sind. Aus diesen Ergebnissen werden dann verschiedene Schlüsse auf Ehe, Enthaltsamkeit u.s.w. und ihre Bedeutung für die geistige Produktion gezogen. Verfasser sieht den Hauptwert seiner Untersuchung nicht darin wissenschaftlich gesicherte Tatsachen mizuteilen, sondern zu weiterem Forschen in diesem Gebiete anzuregen. SKUBICH (Magdeburg)

776. PIETRUSKY, Das Verhalten der Augen im Schlaf. *Klin. Monatsbl. f. Augenheilk.,* 1922, **68**, 355–360.

Im schlaf führen Kinder und Erwachsene langsame und gleichmässige aber durchaus nicht gleichsinnige Augenbewegungen aus.

Bei Säuglingen unter 3 Jahren ist die Pupille im tiefsten Schlaf deutlich weiter als beim Erwachsenen, dagegen ist die Pupillenerweiterung, wie sie im Moment des Erwachens auftritt, bei den Säuglingen langsamer und nicht so umfangreich. Eigene Ansichten über die Genese der Schlafbewegungen werden nicht geäussert und auch in eine kritische Besprechung der Literatur nicht eingetreten.

KOELLNER (Würzburg)

777. JACOBI, W., Ueber Schädigungen durch hypnotische und spiritistische Sitzungen. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**, 189.

Man liest selten von sicheren, einwandfrei festgestellten Gesundheitsstörungen durch hypnotische Experimente. Hier werden einige Krankengeschichten mitgeteilt, aus denen hervorgeht, dass hypnotische und sog. spiritistische Sitzungen zu wochen- bis monatelangen Psychosen führen können, die alle als hypnotisch angesprochen werden, wahnhaft-hallucinatorischen Charakter tragen und auch bei vorher geistig ganz Gesunden, Unbelasteten auftreten können.

W. RIESE (Frankfurt a/M.)

778. LEPPMANN, F., Zur forensischen Beurteilung des Kokainmissbrauchs. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**, S. 89.

Kokain wird nicht nur gespritzt, sondern neuerdings auch mit Vorliebe geschnupft. Specifische Straftaten, die für Kocainisten charakteristisch wären, gibt es nicht. Höchstens führt die durch Kocain bedingte geschlechtliche Erregung häufiger zu Homosexualität, die den Süchtigen in Conflict mit dem Strafgesetz bringt. Kocainmissbrauch findet sich oft bei schwachsinnigen Psychopathen neben Spielleidenschaft und geschlechtlicher Perversion. Trockenheit im Halse und belegte Stimme sind die für Kocainismus verräterischen Zeichen auf körperlichem Gebiete. Auf psychischem Gebiete kann es zu schweren hallucinatorischen Erregungen kommen.

W. RIESE (Frankfurt a/M.)

779. HÖPLER, Ein Fall von Notzucht an einer Hypnotisierten. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**, S. 37.

Ein 17 Jahre altes, äusserst leicht hypnotisierbares Mädchen wird in Hypnose von 2 Männern geschlechtlich missbraucht und erhält die Suggestion der posthypnotischen Amnesie. In einer neuen Hyp-

nose wird dann von anderer Seite und in der Gerichtsverhandlung die Amnesie beseitigt und der Tatbestand aufgedeckt. Ueber das Strafmass der geständigen Verbrecher wird nichts mitgeteilt.

W. Riese (Frankfurt a/M.)

780. Berliner, A., Gibt der allgemeine Eindruck einer Werbung Aufschluss über die Grösse des Geschäfts? *Praktische Psychol.*, 1922, **3**, 200–213.

Nicht deutsch sprechende Ausländer hatten ihrem allgemeinen Eindruck entsprechend Reihen deutscher Reklameinserate nach " big business " anzuordnen. Die Ergebnisse wurden nach den verschiedensten Richtungen hin korrelations- und variationsstatistisch ausgewertet. Der allgemeine Eindruck einer Reklame weckt ein gewisses bild über die Grösse des Unternehmens, wobei die Vorstellung " big business " unabhängig ist von der Grösse der Werbung. Die Entscheidung für eine Werbung darf aber nicht nur von der Höhe ihres Rangplatzes bei Beurteilung durch eine Masse von Personen abhängig gemacht werden, sondern mindestens in eben Masse von den Schwankungen, denen eine Beurteilung unterliegt. Die Vorfrage, ob die Variabilität eines Reizes eine ihm eigentüm liche Eigenschaft ist, löst sich in bejahendem Sinne mit der Einschränkung, dass diese Eigenschaft nicht stark hervortritt. Das rein psychologische Problem nach der Variabilität der Versuchspersonen beantwortet sich in dem Sinne, dass diejenigen Personen, die bei einer Anordnung Übereinstimmung mit dem Durchschnitt zeigen, auch bei weiteren Anordnungen gleichsinnig arbeiten. In einem methodologischen Anhang wird die Korrelation zwischen den einzelnen Reihengruppen als ungeeignet Vergleich der Variabilität erwiesen; innerhalb der Abteilungen sind die reinen Variabilitätsmasse zuverlässige Indikatoren.

H. Bogen (Berlin)

781. Moll, A., Beiträge zur Psychologie der Zeugenaussage mit besonderer Berücksichtigung des Kleppelsdorfer Mordprozesses. *Praktische Psychol.*, 1922, **3**, 230–239.

Das entscheidende Moment in dem in Rede stehenden Prozess ist der Alibibeweis des Angeklagten. Mehrere Zeugen behaupten mit dem Angeklagten, dass dieser während der Zeit, in der die Ermordung zweier Mädchen in einem unter dem Aufenthaltsraum des Angeklagten liegenden Zimmer geschah, dieser immer mit den erwähnten

Zeugen zusammen im Zimmer gewesen sei, sodass er als Täter nicht in Frage komme. Das Gericht neigte zu der Annahme, dass der Anklagte den Zeugen ihre Aussagen durch Suggestion, Hypnose oder im Dämmerzus stand beigebracht habe. Demgegenüber zeigte der medezinische Gerichtssachverständige u. a. durchein in Gegenwart der Richter vorgeführtes Experiment auf, dass eine einfache Wahrnehmungstäuschung der Zeugen durchaus im Bereich der Möglichkeit liege. Die Wahrnehmungstäuschung wurde in vorliegendem Falle darin liegen, dass die im Zimmer mit dem Angeklagten befindlichen Zeugen eine Entfernung desselben auf kurze Zeit gar nicht wahrgenommen haben.

H. Bogen (Berlin)

782. Robinson, E. S., and Richardson-Robinson, F., Effects of Loss of Sleep (2). *J. of Exper. Psychol.*, 1922, **5**, 93–100.

The writers of this article, in continuation of work already reported, discuss the effect of insomnia upon a group of 31 college students. Forms 5, 7 and 9 of the Alpha tests were given to this group and a control group of 39 students on three successive mornings. The first group went without sleep the night after taking the first test, and until the completion of the second testing. Examination of the scores of both groups reveals the interesting fact that insomnia had no appreciable effect upon accomplishment. All of the members of the first group reported nervousness, irritability, dullness, *etc.*, on the second day; but they also reported the exertion of their best effort during the second examination. This effort, combined with the greater interest which this group took in the experiment, undoubtedly compensated for any decrease in efficiency due to loss of sleep.

C. C. Pratt (Harvard)

9. NERVOUS AND MENTAL DISORDERS

783. Brunner, H., Klinische Beiträge zur Frage der Amusie. *Arch. f. Ohren-Nasen und Kehlkopfheilkunde*, 1922, **109**, 47–62.

Der Verf. bespricht zwei klinische Fälle, in denen bei Beschädigung, des rechten Schläfelappens das Symptomenbild der Amusie eintrat, während dieser doch bei Rechtshändern noch immer als eine durchaus stumme Region " des Gehirns gilt. Nach einer Auseinandersetzung mit der geistreichen Theorie Pfeifers, dass das kortikale Ende der Hörstrahlung links für den Musiksinn verant-

wortlich sei kommt B. zu dem Schlusse, dass in seinen beiden Fällen die amusische Störung durch die organische Hirnläsion überhaupt nicht erklärt werden könne, sondern auf einer funktionellen Erkraung des ganzen Gehirns beruhe. O. Klemm (Leipzig)

784. Schott, E., Ueber einen Zustand von monatelanger schlafähnlicher Bewusstseinstrübung nebst Bemerkungen über funktionelle Störungen. *Deutsche Zeitsch. f. Nervenheilkunde,* 1921, **71**, 68–95.

Der erste vom Verf. mitgeteilte Fall ist im Hindblick auf den bekannten Fall Strümpells (*Deutschen Arch. f. klin. Medizen.,* 1878), in dem von Sinnesgebieten nur noch *ein* Auge und *ein* Ohr funktionierten und Verschluss dieser letzteren Schlaf hervorrief, sehr interessant. Der schlafähnliche Zustand entwickelte sich allmählich im Anschluss an ein Kopftrauma mit Basisfraktur. Pupillen verengt, Puls verlangsamt, Blutdruck herabgesetzt. Haut sensibilität mit Ausnahme der Fussohle völlig aufgehoben. Spontanbewegungen minimal. Die Mahlzeiten werden, nachdem man Patient geweckt hat, automatisch aufgegessen. Bekommt er nichts, verlangt er auch nichts (einmal 36 stundiges Hungern). Während er seinen Namen schreibt, schläft er ein, ebenso bei allen Fragen, die irgendwelches Nachdenken erfordern. Später, nach Eintritt einer gewissen Besserung, trat ein schon von Strümpell schon beschriebenes Symptom auf: alle Bewegungen konnten nur ausgeführt werden, wenn Patient sie mit den Augen kontrollierte. Keine Ataxie. Bei passiven Augenschluss sofort Einschlafen. Weiterhin Bild einer rechtsseitigen Hemiplegie. Verf. schliesst Hysterie aus und akzeptiert im Wesentlichen die Strümpellsche Auffassung. Th. Ziehen (Halle)

785. Benedek, L., und Porsche, F., Amnestischer Symptomenkomplex nach Meningismus. *Deutsche Zeits. f. Nervenheilkunde,* 1921, **71**, 320–329.

Kurze Beschreibung eines Korsakowschen amnestischen Symptomenkomplexes. Th. Ziehen (Halle)

786. Siebert, H., Die Stellung der Neurosen zueinander und zu den Psychosen. *Deutsche Zeitsch. f. Nervenheilkunde,* 1921, **71**, 297–305.

Nichts wesentlich Neues für die Psychologie.

Th. Ziehen (Halle)

787. Hübner, A. H., Zur Neurosenfrage. *Aerztliche Sachverständigen-Zeitung,* 1922, **28**, 2.

Neben den symptomatologisch-interessanten Details erscheint von besonderer Bedeutung die hier aufgeworfene Frage, ob der Patient rechtlich verpflichtet ist, sich einer psychotherapeutischen Behandlung zu unterwerfen. Dies ist zu bejahen bei allen schmerzlosen Massnahmen. Der Neurotiker *nach* dem Kriege gleicht mehr dem Unfallkranken, es finden sich kaum noch gröbere Zitterund Lähmungserscheinungen, Hemmungs- und Depressionszustände. Mitteilung eigener therapeutischer Erfahrungen.

W. Riese (Frankfurt a/M.)

788. Klee, K., Die Behandlung der geistig Abnormen im deutschen und im italienischen Strafgesetzentwurf. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**.

Der Verfasser erblickt in dem italienischen Strafgesetzentwurf wesentliche Fortschritte gegenüber dem neuen deutschen Strafgesetzentwurf. Von prinzipieller Bedeutung ist die Tatsache, dass der italienische Staat fortab keinen menschlichen Richter mehr autorisiert, die sittliche Schuld eines menschlichen Geschöpfes zu ermessen. Die neue Justiz verzichtet daher auf eine Beurteilung der moralischen Zurechenbarkeit und beschränkt sich darauf, der Gefährlichkeit des Verbrechers Rechnung zu tragen. Die geschieht in Form ganz bestimmter Sanktionen, die auch bei kriminellen Geistesschwachen Platz zu greifen haben. Für solche gibt es, je nach Art ihrer Gefährlichkeit und je nach Art ihrer Krankheit Strafirrenanstalten, Ueberwachungsanstalten und besondere landwirtschaftliche Arbeitskolonien (vorwiegend für Psychoneuropathen).

W. Riese (Frankfurt a/M.)

789. Zimmermann, F., Die Einteilung der Unfallneurosen. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**, 261.

Die Einteilung des juristischen Verfassers fusst weniger auf medizinisch-diagnostischen Begriffen als auf praktisch verwertbaren Gesichtspunkten: sicher durch Unfall bedingte Krankheiten, sicher durch Unfall nicht bedingte Krankheiten, teilweise durch Unfall bedingte und also teilweise entschädigungsberechtigte Krankheiten. Warnung vor Dauerrenten, welche durch Arbeitsentwöhnung zu Gesundheitsschädigungen führen können.

W. Riese (Frankfurt a/M.)

790. Jacobi, P., Die gerichtsärztliche Beurteilung der hirnverletzten Aphasischen. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**, 213 und 228.

Die für den gerichtsärztlichen Beurteiler wichtigen Fragen betreffen die Testierfähigkeit des Aphasischen, seine etwaige Entmündigung, die Anfechtung der Ehe auf Grund einer etwa aufgehobenen geistigen Gemeinschaft zwischen den Ehegatten, seine Rentenberechtigung und Erwerbsfähigkeit, seine Zeugnisfähigkeit, Zurechnungsfähigkeit, Verhandlungs- und Straffvollzugsfähigkeit. Die Beantwortung dieser Fragen wird verschieden ausfallen müssen, je nachdem es sich handelt um reine Formen der motorischen Aphasie, um subcorticale-sensorische, corticale oder transcorticale Aphasie.

W. Riese (Frankfurt a/M.)

791. Lachmund, Ueber Schlafkrankheit und Tumor des Hirnstammes als Unfallforge. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**, 104.

Im Anschluss an mehrere Unfälle und 2 Jahre nach dem letzten wird ein psychisches Krankheitsbild festgestellt, in dessen Vordergrund Augenstörungen und Schlafsucht stehen, welch letztere allmählich in Benommenheit übergeht. Die diagnose schwankt zwischen Tumor und Encephalitis lethargica, die Sektion bestätigt den Tumor, und zwar ein Gliom des proximalen Teils der Brücke. Causalzusammenhang mit Unfall wird angenommen.

W. Riese (Frankfurt a/M.)

792. Deist, H., Die Bedeutung der Frühzeitigen Abrenzung von epileptischen und hysterischen Zuständen nach Unfall. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**, 77.

Aerzte lassen sich oft verleiten, die folgenschwere Diagnose einer traumatischen Epilepsie auf Grund anamnestischer Daten, aber ohne eigene Beobachtung epileptischer Zustände zu stellen. Wenn es sich dabei nur um einen Rentenhysteriker handelt, ist durch Gewährung einer Rente unter der Diagnose Epilepsie alles zur Herbeiführung der Gesundung versäumt worden. So mussten bei einem Unfallkranken, dessen Krankengeschichte ausführlich mitgeteilt wird, erst 30 Jahre vergehen, bis die richtige Durchforschung der Vorgeschichte und die Beobachtung zur richtigen Diagnose einer Rentenhysterie führten. Der Mann war im Laufe der Jahrzehnte und unter dem Einfluss der Fehldiagnose so schwer psychisch verändert worden, dass an Repara-

tion der Störung oder Rentenentzug nicht mehr gedacht werden konnte.

W. Riese (Frankfurt a/M.)

793. Engelen, Die Beachtung der Vagotonie bei der Beurteilung von Traumatikern. *Aerztliche Sachverständigen-Zeitung*, 1921, **27**, S. 19.

Bei posttraumatischen nervösen Beschwerden ist ganz besonders auf das constitutionelle Moment zu achten. Ein einmaliger Shock führt zu Störungen, die meist reparabel sind. Wo aber neurasthenische Erscheinungen bestehen bleiben und die Untersuchung Funktionsstörungen im Vagussystem aufdeckt, sind constitutionelle Grundlagen anzunehmen und Ersatzansprüche abzulehnen.

W. Riese (Frankfurt a/M.)

794. Kittel, W., Beitrag zu klinischen und forensischen Beurteilung querulatorischer Zustandsbilder. *Aerztliche Sachverständigen-Zeitung*, 1920, **26**, S. 233.

Mit der Annahme eines " Querulantenwahns " ist es nicht immer getan: Wahnbildungen auf Grund vermeintlicher rechtlicher Benachteiligung kommen als äusserlich *ähnliche* Zustandsbilder bei sehr *verschiedenen* zugrunde liegenden Processen vor. Zur Erläuterung werden mitgeteilt ausführliche Krankengeschichten eines abnorm Veranlagten, nicht eigentlich Geisteskranken, bei dem periodisch querulatorische Anfälle als reactive Störungen äusserer Reibungen auftreten, sowie eines Manisch-Depressiven, dessen einzelne manische Attacken stark querulatorisch gefärbt waren. Die richtige klinische Erfassung und Bewertung solcher Zustandsbilder gewinnt besondere Bedeutung für die gutachtliche Entscheidung der Frage, ob strafausschliessende Gründe vorliegen oder nicht.

W. Riese (Frankfurt a/M.)

795. Herhold, Zur Beurteilung der Neurasthenie in Rentensachen. *Aerztliche Sachverständigen-Zeitung*, 1922, **28**, S. 97.

Warnung vor leichtfertiger Zubilligung einer Rente an leichte oder mittelschwere Neurastheniker, denen die einmal gewährte Rente schwer wieder abzundehmen ist, und die durch sie im Bewusstsein der Erwerbsbeschränkung bestärkt werden.

W. Riese (Frankfurt a/M.)

796. Schob, Ueber psychische Störungen nach Durchschuss beider Stirnlappen. *Allgemeine Zeits. f. Psychiat. u. psychischgerichtliche Medizin,* 1921, **77**, S. 281–294.

Mitteilung eines interessanten Falles von Querschuss durch beide Stirnlappen. Leider ist die Intelligenzprüfung nur sehr oberflächlich ausgeführt. Verf. glaubt aber schliessen zu können, dass ein Defektzustand vorgelegen habe, der "in einer ausgeprägten Veränderung der geistigen Gesamtpersönlichkeit, in Störungen der höheren intellektuellen Leistungen und in Veränderungen des Charakters sich kundgibt," und dass vielleicht auch den Mangel an Initiative und die auffallende Euphorie als Lokalsymptome anzusehen sind.

Th. Ziehen (Halle)

797. Berze, J., Schizophrenie und psychologische Auffassungen. *Allgemeine Zeits. f. Psychiat. u. psychisch-gerichtliche Medizin,* 1921, **77**, S. 58–154.

Sehr ausführliche polemische Auseinandersetzungen mit Bleuler, der die Symptome der Dementia praecox (Schizophrenie) auf "Schwäche der Assoziationsspannung" zurückfuhren zu können meint, während Verf. von jeder assoziationspsychologischen Erklärung absehen will und in der "Insufficienz der psychischen Aktivitat" (Hypophrenie) die Grundlage der schizophrenen Symptoms erblickt.

Th. Ziehen (Halle)

798. Less, E., Erfahrungen mit der Jacobsohnschen Gesinnungsprüfung. *Allgemeine. f. Psychiat. u. psychisch-gerichtliche Medizin,* 1921, **77**, 221–254.

Verf. hat die Fernaldsche Methode der Prüfung ethische Gefuhlstöne in der Jacobsohnschen Modifikation bei 12 Jugendlichen im Alter von 12–18 Jahren verwendet (darunter 3 Begutachtungsfälle der psychiatrischen Klinik, 8 Rettungshauszöglinge), ausserdem bei zwei 22 jahrigen zur Begutachtung aufgenommenen Patienten Die Protokolle werden ausführlich mitgeteilt, die Ergebnisse nach dem Jacobsohnschen Schema zusammengestellt. Verf. betont die Schwierigkeiten, die der Methode anhaften: dahin gehört bei Rettungshauszöglingen, die fast immer "etwas auf dem Kerbholz haben," die Angst, dass alles herausgekommen ware, ferner durchschauen die Zöglinge meistens den Zweck des Untersuchers und "setzen sich moralisch zurecht." Daher meint Verf., dass die Ergebnisse prinzi-

piell nur sehr vorsichtig zusammen mit Anamnese und Intelligenzprüfung benutzt werden sollten.

TH. ZIEHEN (Halle)

799. STUCHLIK, J., Ueber die praktische Anwendung des Assoziationsexperimentes. *Arch. f. Psychiat. u. Nervenkrankheiten*, 1921, **62**, 441–514; 812–878.

Nach ausführlichen methodologischen Vorbemerkungen erörtert Verf. die Prüfung auf Simultation mit Hilfe des Assoziations experiments (Art und Weise der Komplexäusserung). Er glaubt, dass die "psychische Genese einer Tat oder Erscheinung" sich auf diesem Wege sicher nachweisen lässt. Die zum Teil sehr interessanten Beispiele entstammen der militärärztlichen Praxis (Simulation von Schwerhörigkeit, Uebertreibung eines Gebrechens, Verdacht der Selbstbeschädigung usf.). Verf. nimmt an, dass affektbetonte Vorstellungen im Assoziationsexperiment eine längere Reaktions zeit aufweisen (S. 464) und "unangenehm affektierte" Vorstellungen leichter wach werden und sich leichter hervorrufen lassen als angenehm betonte (S. 459). Die weiteren Untersuchungen beschäftigen sich mit der Frage, ob durch das Assoziationsexperiment auch die affektive Gesamtlage (Depression, Euphorie usf.), Ein Characterhauptzug (Zerfahrenheit, Prahlerei usf.), eine abnorme psychische Konstitution (Neurasthenie, psychasthenie, Hysterie) und psychische Krankheiten (z. B. Debilität, Dementia praecox usf.) nachgewiesen werden können. Auch hier berichtet Verf. über positive Ergebnisse. So soll z. B. bei habitueller Euphorie (auch ohne Psychose) die Reaktionszeit stark verkürzt sein, Neigung zu blossen Wortergänzungen und anderen Verbalassoziationen und inhaltliche Armseligkeit der Assoziation bestehen; massgebend ist of die Zugehörigkeit des Reizworts zu einer Wortgruppe oder inhaltlichen Begriffsgruppe auf Grund eines wertlosen Merkmals (z. B. Tränen—Flüssigkeit). Die vorhandene Literatur bleibt fast ganz unberücksichtigt.

TH. ZIEHEN (Halle)

800. OBERHOLZER, E., Phobie eines sechsjährigen Knaben. *Schweizer. pädag. Zeits.*, 1922, **32**, 27–31.

Die einem ertappten Onanisten gegenüber scherzhafterweise ausgesprochene Kastrationsdrohung des Vaters führt zu allerlei Angstzuständen, die alle Symbolcharakter aufweisen. Der Knabe

setzt z. B. seine Ferse symbolisch und datsächlich als Ersatz für das Geschlechtsglied, dessen Kastration ihm angedroht ist, ein. Folgerung: Das Kind liebt sein Genital und legt ihm eine Bedeutung bei, wie kaum einem andern Körperteil." H. Bogen (Berlin)

801. Richmond, W. Psychometric Tests in Essential Epilepsy. *J. of Abnor. Psychol. and Social Psychol.*, 1922, **16**, 384–391.

Dr. Richmond reports on seven cases of essential epilepsy, and concludes with the following summary: 1. Essential or idiopathic epilepsy is a "life reaction disorder," with characteristic mental stigmata; psychometric tests, in addition to a mental level and the indication of the presence or absence of deterioration, ought also to give some indication of the characteristic mental attitude, thus enabling us to suspect the presence of "the great disorder" when the history of seizures is vague or entirely absent. 2. The present article reports the results of the study of a group of seven essential epileptics, so selected as to range from the greatly deteriorated to those deteriorated slightly if at all. The Stanford-Binet was used, and repeated association tests were made with the Kent-Rosanoff series of 100 words. 3. Disorders of attention show in every case on the Stanford. All have to have directions repeated, get confused and need extra explanation, fail tests well within their ability because they forget part of the *Aufgabe* or fail to notice all of the factors involved. Poor motor coördination shows in almost every case, and is greater or less according to the degree of deterioration. The vocabulary is consistently poor, even in the cases from good homes. 4. Interest in the test itself is subordinated to desire for approval and interest in the examiner's attitude toward the subject—an egoistic attitude. 5. The association shows in every case delayed reaction times and an abnormal type of response, perseveration of one idea or association to a preceding one. These tendencies lessen as the general condition improves. 6. The mental condition, as shown by the tests, bears no essential relation to the frequency or severity of the seizures.

D. A. Macfarlane (Boston Psychopathic Hospital)

802. Taylor, W. S., A Hypnoanalytic Study of Two Cases of War Neurosis. *J. of Abnor. Psychol. and Social Psychol.*, 1922, **16**, 344–355.

The device of hypnosis is used by the writer, to search out the details of the "psychic" or other traumatic experiences, which

formed the basis for the neuroses. By giving the "explanation" while the patient is still under hypnosis, and by positively suggesting to the patient that he recall these details after waking, the writer incorporates into his methods the most important feature of Freudian psychoanalysis, that of waking recall, which is essential to reintegration. An attempt is made, in the description of the two cases, to explain the disorders and their adjustment in behavioristic terms; translating the mystical language of Freud into that of Sherrington and Watson.

D. A. MACFARLANE (Boston Psychopathic Hospital)

10. INDIVIDUAL, RACIAL AND SOCIAL PSYCHOLOGY

803. STADELMANN, Die Eignung der Frau zum Richteramt. *Aerztliche Sachverständigen-Zeitung,* 1922, **28**, S. 37.

Wenn der juristische Verfasser in der Art der Intelligenz des Mannes und des Weibes bedeutsame und prinzipielle Unterschiede erblickt, so ist ihm darin gewiss beizustimmen. Da aber die Frau mit und trotz der ihr eigenen, mehr auf Intuition als auf Abstraction aufgebauten Denkweise als Lehrerin, Aerztin usw. ihre Eignung erwiesen hat, in Berufen also, die durchaus leidenschaftslose Objektivität erheischen, ist es ein missliches Unterfangen, ihr gerade auf Grund einer Unfähigkeit dazu die Eignung zum Richteramt abzusprechen. Auch die physischen Schwankungen im Leben der Frau—Menstruation, Schwangerschaft, Wechselahre—haben ihrer Tatigkeit in anderen bislang "mannlichen" Berufen keinen Abbruch getan. Und menschlichen Unzulänglichkeiten (wie Beeinflussbarkeit, durch Aeusseres, Auftreten usw. des Angeklagten) ist der Mann wohl auch unterworfen. Auf die mangelnde Achtung des Mannes vor der Frau, die hierzulande herrschen soll und der Autorität des (weiblichen) Richters schaden könnte, hätte der Verfasser gut getan, nicht hinzuweisen.

W. RIESE (Frankfurt a/M.)

804. MOLL, A., Die Eignung der Frau zum Richteramt. *Aerztliche Sachverständigen-Zeitung,* 1922, **28**, S. 42.

Dieser auch in weiteren Kreisen bekannte ärztliche Autor macht sich die Sache wesentlich weniger leicht. Er begreift den grossen Umfang des schwierigen Problems und begnügt sich nicht mit der Aufzählung traditioneller Vorurteile und Fehlschlüsse. Von prinzi-

pieller Bedeutung erscheint uns der Hinweis, dass gewisse, durch Erfahrungen aus dem täglichen Leben, Umfragen, Statistiken usw. festgestellte physische und psychische Mängel der *durchschnittlichen* beruflich tätigen Frau die Zulassung der für das Richteramt *Geeigneten* nicht ausschliessen sollten. Uebrigens stellt er sehr mit Recht dem störenden Einfluss des starken Gefühlsleben beim Weibe seine dem Manne oft überlegene, gefuhlsmässig vermittelte Menschenkenntnis gegenüber, seine Fähigkeit, sich in die Seele eines anderen Menschen hineinzuversetzen. M. sieht keinen genügenden Grund, die geeignete Frau vom Richteramt auszuschliessen.

W. Riese (Frankfurt a/M.)

805. Strassmann, F., Die Freigabe der Vernichtung lebensunwerten Lebens. *Aerztliche Sachverständigen-Zeitung,* 1922, **27**, S. 7.

Im Prinzip deckt sich die Auffassung dieses Autors mit derjenigen von *Hoche, Binding* und *Klee.* Im Gegensatz zu letzteren lehnt er aber eine amtliche Organisierung der Tötung an und will insbesondere nichts davon wissen, dass Aerzte als ausführende Organe, als " Scharfrichter " dabei tätig sind.

W. Riese (Frankfurt a/M.)

806. Klee, K., Die Freigabe der Vernichtung lebensunwerten Lebens. *Aerztliche Sachverständigen-Zeitung,* 1921, **27**, S. 1.

Zustimmende Bemerkungen eines Berliner Juristen zu der von *Hoche* und *Binding* unter gleichem Titel erschienenen Schrift, in der Vorschläge unterbreitet werden zur Einführung strafloser Tötung solcher Personen, die in die Tötung einwilligen, unheilbar Kranken, nach Erlösung Verlangenden, Idioten, denen ein Lebenswille überhaupt nicht innewohnt. Im Anschluss daran Entwurf einer staatlichen Organisierung zur Durchführung dieser erweiterten " Sterbehilfe " (Euthanasie).

W. Riese (Frankfurt a/M.)

807. Wittig, K., Der Einfluss des Krieges und der Revolution auf die Kriminalität der Jugendlichen. *Zeits. f. Kinderforschung,* 1920–1922, **26**, 8–39; 64–81.

Die Statistiken der Jugendstrafanstalten und -gerichte zeigen für die Kriegszeit ein mit der Kriegsdauer stetiges Ansteigen der Straffälle. Es mangelt dem Jugendlichen infolge seiner Beweglichkeit

und Suggestibilität an fester Einstellung auf das Volksziel. Hinsichtlich der Beteiligung der Altersklassen tritt in den letzten Kriegsjahren ein Zurückgehen der Straffälligkeit der 18 jährigen auf, teils als Folge ihrer Rekrutierung, teils als Folge ihrer stärker werdenden Anpassungsfähigkeit. Alle Deliktformen sind vertreten. Die Motive des Strafhandelns sind vielfach eine Folge der Aushungerung. Die knappe Kost zeitigte auch ein Seltenerwerden der Sittlichkeitsverbrechen. Erziehungsnot, Nahrungsmangel und Gewissensnot (Vorbild der Kriegswucherer, unmöglich durchzuführende Verordnungen der Regierung) sind die hauptsächlichsten Ursachkomplexe. Die Amnestieerlasse in der Revolution vermindern zunächst die Zahl der Strafanstaltsinsassen. Dem darauffolgenden Ansteigen der Ziffern folgt erst 1920 ein allmähliches Absinken. Arbeitslosigkeit, Klassenkampf der Jugend und Entsittlichung durch schlechte Kino-Aufführungen sind jetzt Hauptursachen der Straffälligkeit der Jugend.

H. Bogen (Berlin)

808. Danziger, Pubertät und Kriminalität. *Neue Erziehung,* 1922, **4**, 65–69.

Die Statistiken zeigen für das Alter von 14–18 Jahren die höchsten Ziffern von Sexual- und Eigentumsdelikten. Der pädagogische Wille zur "Sublimierung" des Trieblebens erfordert kriminalpsychologische Einzelforschung, die ihre Richtlinien aus der Freudschen Psychanalyse herzuleiten hat.

H. Bogen (Berlin)

809. Kraepelin, E., Wesen und Ursachen der Homosexualität. *Zeits. f. padag. Psychol.,* 1922, **23**, 51–56.

Verf. tritt der Auffassung entgegen, dass Homosexualität Anlage sei. Die aus dieser falschen Annahme gezogenen Folgerungen, dass der Homosexuelle auf den besonderen Schutz des Staates Anspruch erheben könne, wird damit hinfällig. Homosexualität ist mit andern sexuellen Entartungserscheinungen als Abgleiten der Triebrichtung aus der natürlichen Bahn zu begreifen. Das "Abgleiten" kann "gezüchtet" werden. In dieser Erkenntnis liegt das Kampfmittel gegen das übermässige Anwachsen der Homosexualität, nämlich der Kampf durch Erziehung.

H. Bogen (Berlin)

810. PARMERLEE, M., Eine biometrische Studie über den englischen Verbrecher. *Arch. f. Kriminol.*, 1922, **74**, 120–129.

Inhaltsangabe und Kritik des Buches von Goring "The English Convict" (1913). Gorings Angriff auf Lombroso ist abzuweisen: "während er (G.) einige Tatsachen vorgebracht hat, um das Bestehen eines anthropologischen kriminellen Typus zu widerlegen (was keiner Widerlegung bedarf), hat er selbst die Lombrososche Theorie viel mehr betont als Lombroso es selbst hat, durch die erheblichen Faktoren des Verbrechens in der Form einer "verbrecherischen Krankheitsanlage" und in seiner unverantwortlichen Geringschätzung des Einflusses "der Macht der Umstände" oder der Umgebung als Ursache des Verbrechens."

O. LIPMANN (Berlin)

811. REISS, Zur Psychologie des Mordes. *Arch. f. Kriminol.*, 1922, **74**, 172–188.

Durch die ausführliche Darstellung eines durch einen russischen Kriegsgefangenen verübten Mordes wird gezeigt, wie "der unerträgliche Druck einer verzweifelten Lebenslage" und "die Versetzung in ein von Grund verschiedenes Kulturmilieu auch bei sonst zureichender Veranlagung" zum Verbrechen führen kann. Der Verfasser findet Analoga zu dem von ihm beschriebenen Fall in vielen aus missverstandenen "bolschevestischen" Ideen entspringenden Gewalttaten gegen Polizeiorgane. In solchen, vom Täter aus gesehen nicht schwerwiegenden Fällen ist dennoch im Interesse der Staatsautorität eine *milde* Bestrafung nicht am Platze.

O. LIPMANN (Berlin)

812. SCHÜTZ, Ein vielfacher Lustmörder und seine Entlarvung durch medizinische Indizienbeweise. *Arch. f. Kriminol.*, 1922, **74**, 201–210.

Durch die im Institut für gerichtliche Medizin an der Universität Leipzig bestehende Sammlung genauer Tatbestandsaufnahmen gelang es nachzuweisen, dass der Beschuldigte mindestens sechs oder sieben in ihren Einzelheiten genau einander entsprechende Lustmorde verübt bzw. zu verüben versucht hat. Im vorliegenden Falle liegt wahrscheinlich nicht Totschlag, sondern Mord vor, weil der Verbrecher wusste, dass nur der langsame, unter Qualen vor sich gehende Tod des Opfers das Ideal zur Befriedigung seines Sexualtriebes darstellt. Auch als unzurechnungsfähig wäre der Verbrecher

nur dann zu bezeichenen, wenn er neben der abnormen sexuellen Veranlagung noch andere sichere Zeichen der Geistesstörung darbietet, oder wenn einwandfrei feststeht, dass er bei Begehung der Tat bewusstlos war. O. LIPMANN (Berlin)

813. v. LISZT. Der Beginn der Empfindungsfähigkeit des Menschen. *Arch. f. Kriminol.*, 1922, **74**, 231–232.

Im Zusammenhange mit der Frage der kriminellen Fruchtabtreibung stellt der Verfasser einige Lehrmeinungen darüber zusammen, von welchem Alter an dem Fötus bzw. dem Neugeborenen eine Schmerzempfindlichkeit zugesprochen werden kann, und aus welchen Anzeichen auf das Vorhandensein einer Schmerzempfindlichkeit geschlossen werden kann. O. LIPMANN (Berlin)

814. WELLS, W. R., The Value for Social Psychology of the Concept of Instinct. *J. of Abnor. Psychol. and Social Psychol.*, 1922, **16**, 334–343.

The writer begins by stating, "In view of a recent tendency among certain psychologists to deny the existence of human instincts in any proper sense of the term, I propose to attempt a brief review of the instinct theory, with special reference to its meaning and value for social psychology." The article is, in the main, a refutation of the two chief criticisms to which the instinct theory has been subjected, first, that an analogy exists between instinct psychology and the discarded faculty psychology, and second, that the responses commonly attributed to instincts are really acquired responses; with reference and, chiefly, in opposition to the views of Field, Allport, Kuo, Kantor, Ayres, and Bernard (all references given). Pains are taken to tread heavily on the views of Ayres, who is quoted as saying, "When instincts fall out institutions get their due . . . The social psychologist has no need of instincts; he has institutions." "The human species is not wild," and more. The writer accepts Watson's definition of instinct and insists that hereditary action-patterns do exist. Favorable reference is made to the position of Loeb on this topic. In substantiation of these notions, a brief space is given over to observations on some of the mechanisms of heredity, and their implications.

To epitomize his stand—"Those who assert that there are no human instincts properly so called, those who deny that there are inherited action-patterns, are asked to account for [certain] facts as

they are recorded, on the basis of extensive observations, by Darwin in The Expression of the Emotions in Man and Animals." "A social psychology that does not base itself upon the instinctive motives of mankind is not getting down to fundamental principles."

D. A. MACFARLANE (Boston Psychopathic Hospital)

815. McDOUGALL, W., Use and Abuse of Instinct in Social Psychology. *J. of Abnor. Psychol. and Social Psychol.*, 1922, **16**, 285–333.

Dr. McDougall takes this opportunity of recognizing some of the more serious opponents of the program of human instincts, and particularly those who object to the classification put forth in his own "Social Psychology." "In most of these articles my Social Psychology is pointed to as the main source of the trouble." " . . . , I feel that the time has come to attempt some answer to the more radical critics." Then follows short treatments and criticisms of the views of such "doubters" as Thorndike, Dunlap, Mason, Kantor, Kuo, Bernard and many others. Some of the criticisms are dismissed summarily and humorously, others are given considerable attention. McDougall still holds, in the main, to the original views as put forth in the text referred to above.

D. A. MACFARLANE (Boston Psychopathic Hospital)

816. CORY, C. E., The Problem of the Individual. *J. of Abnor. Psychol. and Social Psychol.*, 1922, **16**, 374–383.

This discussion, which is, to quite a considerable extent, philosophical, is said by the writer to have been largely prompted by observations of psychopathological phenomena, dual and antagonistic personalities and the like. "I am convinced, however, that no discussion of the problem to-day is complete without recourse to the data of psychopathology." "The organism, at this state of its development, is to some extent a plurality of functions and organs rather than a completely integrated unit." "Just so, in psychological terms, what is called a self is always an ideal rather than an accomplished fact, an ideal that is in various degrees approximated but never attained." The article goes on to discuss the ever present conflicts within the individual, complexes of ideas emotionally colored, which alter the individual's outlook, and modify and complicate his behavior, conflicting emotions and tendencies before which the cold reason of the stoic is of little avail.

D. A. MACFARLANE (Boston Psychopathic Hospital)

817. Sandoz, C. E., Report on Morphinism to the Municipal Court of Boston. *J. of Crim. Law and Crim.*, 1922, **13**, 10–55.

The aim of this article is to present both the legal and the medical significance of morphinism that a mutual understanding between physicians and the officers of the law may be facilitated. The article contains two sections, one on morphinism in general, the other on morphinism in relation to the Municipal Court of Boston. In the first section under the heading of narcotic drugs the author discusses opium, opiates and cocaine. The action of morphine in single doses and in habitual use is considered physically and mentally as regards both causes and effects. Its relation to crime and prostitution is discussed. Under cures, consideration is given to the methods, obstacles and relapses frequently encountered. The second section presents social, medical, criminal and economic data and discusses their implications relative to the group studied in the Boston Court. The article covers the duration and severity of morphinism in this group, its origin and combination with other bad habits, physical and psychological findings, its relation to economic efficiency and criminality, court findings and dispositions. He concludes that a policy of severity in any case of morphinism is justified legally and medically and discusses such a policy. An extensive bibliography is appended.

J. Walker (Boston Psychopathic Hospital)

818. Heindl, R., Penal Settlement and Colonization. *J. of Crim. Law and Crim.*, 1922, **13**, 56–60.

The practical experience of England and France not only does not encourage the founding of new penal colonies from the points of view of reformative, financial or mortality results but suggests the abolition of the present ones.

J. Walker (Boston Psychopathic Hospital)

819. Van Waters, M., The Socialization of Juvenile Court Procedure. *J. of Crim. Law and Crim.*, 1922, **13**, 61–69.

Socialization of the Juvenile Court means the method "which best frees the spirit of the Juvenile Court to serve the social ideal it was created to express," namely that the care, custody and discipline of the court's ward "shall approximate as nearly as may be that which should be given by his parents." A basic requirement in socialization is a technique for getting the whole truth about the child. It "involves coöperation, constructive discipline, and the

dynamic concept, as expressed in the principle that an order by the court may be modfied as life conditions are modified. "It implies that judges and court officials be scientifically trained specialists in the art of human relations. The article calls attention to the advantages of a woman referee judge in girl and young boy cases as established by law in California.

J. WALKER (Boston Psychopathic Hospital)

820. HOLLINGWORTH, L. S., Existing Laws which Authorize Psychologists to Perform Professional Services. *J. of Crim. Law and Crim.*, 1922, **13**, 70–73.

The Committee on Legislation and Information, American Psychological Association, Section of Clinical Psychology reports through its chairman (Dec. 1921) existent laws relating to clinical psychologists. Laws have been passed in the states of Illinois, California, Kansas, Oregon, Wisconsin, New York and South Dakota and in Tasmania.

J. WALKER (Boston Psychopathic Hospital)

821. HEALY, W., Study of the Case Preliminary to Treatment. *J. of Crim. Law and Crim.*, 1922, **13**, 74–81.

Two methods are necessary for effective treatment of juvenile offenders, the first "diagnostic understanding and knowledge of causes" of each specific case and second a study of the effectiveness of measures employed and decisions made. The article urges the absurdity of believing that a percentage statement of intelligence or a few words of classification will tell a valuable story about the individual. His years of experience have shown the necessity of (1) better training of personnel, beginning with judges, (2) placing the whole work on a professional basis, through training and through public education, (3) associations of Juvenile Court judges for the purpose of mutual gain from the interchange of scientifically worked up data concerning types of cases, and (4) measuring success in terms of nonrecurrence of delinquency.

J. WALKER (Boston Psychopathic Hospital)

822. RIDDELL, W. R., The Sad Tale of an Indian Wife. *J. of Crim. Law and Crim.*, 1922, **13**, 82–87.

A review of legal enactments and decisions in Canada which returned to the crown land previously leased to provide for an Indian wife and her three children.

J. WALKER (Boston Psychopathic Hospital)

823. LEVITT, A., Some Societal Aspects of Criminal Law. *J. of Crim. Law and Crim.*, 1922, **13**, 90–104.

The writer states the fundamental problem of criminal law to be the determination and balancing of social and individual interests. "The societal aspects of criminal law are economic, sociological, psychological and philosophical. The state can fulfil its function of protecting society only when it understands the nature of the societal aspects of the criminal law and administers it accordingly." This demands a changing protective system. He discusses the types of deterrent and reformative methods and their effects upon the individual and society. In the interests of the individual the personality and the social, economic and political position of the accused must be considered. The affective qualities of the criminal act he discusses under the heads of liberative, inhibitive, creative and repetitive. This is the first of a series of articles.

J. WALKER (Boston Psychopathic Hospital)

824. SIMS, E. W., On Crime Conditions in Chicago. *J. of Crim. Law and Crim.*, 1922, **13**, 103–108.

The purpose of the Crime Commission of Chicago is to incite responsible people and associations to action "which will restore the administration of criminal justice."

J. WALKER (Boston Psychopathic Hospital)

825. BATES, S., Honor System for Inmates of Prisons and Reformatories. *J. of Crim. Law and Crim.*, 1922, **13**, 109–116.

Bearing in mind that "the ultimate aim of the administration of criminal law is the protection of society" the writer discusses the desirability of honor systems for inmates of prisons and reformatories. He insists that segregation and elimination of feebleminded or otherwise "mentally deficient prisoners" should precede any successful introduction of self-government. He offers additional "qualifications, which if adopted may render the self-government system less dangerous and more acceptable." Self-government should be restricted so that it does not interfere with the real management of the institution. The right of self-government should be earned by the inmate and his education (he must know before he can best decide) should precede the powers and privileges of participating in self-government.

J. WALKER (Boston Psychopathic Hospital)

11. MENTAL DEVELOPMENT IN MAN.

826. Brühl, G., Versongung schwerhöriger Schulkinder in Berlin. *Arch. f. Ohren-Nasen und Kehlkopfheilkunde,* 1921, **108**, 20–30.

In den Schwerhörigenschulen Berlins sind bisher rund 300 Kinder vereintgt. Diese Zahl entspricht dem durchsschnittlichen Vorkommen der hochgradigen Schwerhörigkeit unter den Schulkindern überhaupt. Dabei giet als Pessimum des Hörvermögens für das Mitkommen in der Volksschule das Hören von ungefähr 2.5 m. Umgangssprache mit beiden Ohren und abgewendetem Gesichte. Immerhin sind in der Organisation und in der Erfassung der hochgradigen und nicht heilbaren Schwerhörigen immer noch mancherlei organisatorische Schwierigkeiten zu überwinden.

O. Klemm (Leipzig)

827. Falkenberg, W., Bemerkungen zum Jugendgerichtsgesetsentwurf. *Aertliche Sachverständigen-Zeitung,* 1921, **27**, 113.

In dem neuen deutschen Entwurf eines Jugendgerichtsgesetzes erblickt der Verfasser vom ärztlichen Standpunkt aus einen bedeutenden Fortschritt. Der Geist des neuen Gesetzes sei der, dass der Jugendliche nicht durch Strafe—ganz besonders nicht durch Freiheitsstrafe—sondern durch erzieherische Mittel über die Gesetzwidrigkeit seiner strafbaren Handlungen zu belehren sei. Als Beispiele solcher Erziehungsmassnahmen führt der Entwurf auf: Ermahnung der Jugendlichen, Stellung unter Schutzaufsicht bis zur Dauer von 3 Jahren. Der Strafvollzug selbst, sofern er unvermeidlich erscheint, habe in besonderen nur für Jugendliche bestimmten Anstälten zu geschehen.

W. Riese (Frankfurt a/M)

828. Zum Seelenleben des einzigen Kindes. Von einem " Einzigen." *Zeits. f. Kinderforschung,* 1921, **26**, 91–97, 113–128.

Einige Charaktereigentümlichkeiten werden häufig als für einzige Kinder typisch aufgefasst und als Folge ihres geschwisterlosen Aufwachsens dargestellt. Der ungenannte Verfasser versucht im Rückblick auf seine eigene Entwicklung die verschiedenen Ursachen in für den Einzigen zufällige und wesentliche zu scheiden, indem er sich selbst analysierend den Einfluss der Erbmasse, sozialen und wirtschaftlichen Lage und der sittlichen Entwicklungshöhe des

Elternhauses aus den Ursachkomplexen herausschält. Geschwisterlosigkeit wird als gemütliche Lücke empfunden, braucht jedoch nicht zum Mangel an sozialem Empfinden zu führen. Der Kampf zwischen Egoistischem und Alteruistischem scheint beim Einzigen besonders stark zu sein. Körperliche und geistige Verwöhntheit ist ehrer eine Folge der wirtschaftlichen Lage als des Einzigseins in der Familie. Das gleiche gilt für die Unselbständigkeit des Handelns. Für die normale Entwicklung der sexuellen anlagen bedeutete das Einziges-sein für den Verfasser eine starke Hemmung.

H. Bogen (Berlin)

829. Harms, B., Die Urseuen des Sitzenbleibens bei Schulkindern. *Zeits. f. Kinderforschung,* 1921, **27**, 1–24.

Verfasser hat sich in seiner Eigenschaft als Schularzt eingehend mit der Familienanamnese und der psychophysischen Konstitution der nicht regelmässig fortschreitenden Kinder einiger Schulen vertraut gemacht. Die Ursachen des Sitzenbleibens sind nicht Faulheit und Unlust, die mit strengen erzieherischen Massnahmen zu bekämpfen sind, sondern die Gründe liegen in der seelischen Entwicklung des Kindes, die in besonderem Masse durch gewisse Krankheiten, in geringerem Masse durch Einwirkung der Aussenwelt beeinflusst sind. Rachitis und Apsosexia nasalis sind mit 37,5 und 50% als beeinflussende Krankheiten feststellbar. Die untersuchten Kinder wiesen als innere Ursachen des Zurückbleibens in der Schule Neuropathie zu 45,8% und Debiltät zu 41,7% auf. Für den Rest waren Schulversäumnis wegen Krankheit und häusliche Verhältnisse als äussere Ursachen massgebend.

H. Bogen (Berlin)

830. Lund, D., Der suggestive Einfluss des Films auf die Kinder. *Zeits. f. Kinderfoschung,* 1921, **26**, 300–303.

Vergleichende Beliebtheitsstatistik an Volksschülern und Verwahrlosten zeigt dass die letzteren Detektiv-, Verbrecher- und Abenteurerfilme weit mehr bevorzugen als die Volksschüler. (59% :38%) Bei den Volksschülern stehen vor allem Scherzbilder (mit 25% der Beliebtheit) im Vordergrund. Die Schilderung der Filme durch die Verwahrlosten zeigt, welchen hohen Grad von Gefühlsbetonung der Inhalt der Dramen für sie besessen hat. Es wird geschlossen, dass der suggestive Einfluss des Films in mehreren Fällen die direkte Ursache der asozialen Handlung gewesen ist.

H. Bogen (Berlin)

831. WEBER, W., Das Problem der Veränderung psychophysischer und psychischer Funktionen durch die Übungsfähigkeit. *Psychol. Mitteilungen,* 1922, **3**, 1–5.

Es ist zu untersuchen, wie sich der Unterschied zwischen zwei sehr verschiedenen Prüfergebnissen zu dem Unterschied nach halb-, ein-, und mehrjähriger Berufstätigkeit verhält. Es wird dann zu scheiden sein zwischen Fähigkeiten, bei denen sich durch Übung ein Ausgleich unter Individuen mit verschiedener Anfangsleistung erzielen lässt und solchen, bei denen der Ausgleich nie eintritt. Hieraus ergibt sich dann eine Gruppe von Fähigkeiten, die für Eignungsprüfungen überhaupt nicht in Frage kommen. Als zweitwichtigstes Problem hat zu gelten die Frage, ob es eine allgemeine Übungsfähigkeit gibt oder ob bei jeder Tätigkeit die Übungsfähigkeit eine andere ist. Sollte das der Fall sein, so sind für die einzelnen Berufe Methoden aufzustellen, mit deren Hilfe man feststellen kann, ob ein Anwärtereinen Beruf rasch erlernen wird. Entsprechend wäre die Umbildung einer Fähigkeit durch Übung zu untersuchen.

H. BOGEN (Berlin)

832. NUYKEN, W., Der psychologische Beobachtungsbogen in der Praxis. *Psychol. Mitteilungen,* 1922, **3**, 5–13.

An Beispielen aus der Praxis der Schulbeobachtung und der Beratungstätigkeit des Berufsamtes wird erwiesen, dass die Schulbeobachtung die Grundlage abgibt für die Zuteilung eines Ratsuchenden zu einer Berufs gruppe. Die Sonderbegabung für eine Berufsart muss sich dann innerhalb jeder Berufsgruppe durch die spätere Lehrzeit und das hier einsetzende Eignungsexperiment erkunden lassen.

H. BOGEN (Berlin)

833. STERN, W., Vom Ichbewusstsein des Jugendlichen. *Zeits. f. pädag. Psychol.,* 1922, **23**, 8–16.

Die Reifungszeit ist für den Jugendlichen die Zeit der Entdeckung der Werte der Auseinandersetzung zwischen dem Ichwert und den Weltwerten. Die Erkenntnis des Jugendlichen, dass neben der Aussenwelt eine Ichwelt existiert, führt ihn in ein Stadium der Egoreflexion. Das Wesen dieser Zeit ist jedoch nicht in der Analyse zu sehen, sondern in der Synthese, die der Reflektierende in der Form regulativer Ideen erstrebt. So wird das Ich allem Einzelerleben als ein Selbstwert übergeordnet. Die Ich-Betonung im

Reifungsalter hat ihren Grund in dem Reizwert, den die Neuheit der Entdeckung des Ich in sich schliesst. Zum Unterschied vom kindlichen Egoismus ist die Ich-Betonung Subjektivismus. Starke Minderwertigkeitsgefühle, sowie Sucht zur Selbsterhöhung haben auch zum Teil ihre Ursachen in den Spannungen der Pubertätpsyche und sind als Täuschungen des Ichbewusstseins anzusprechen.

H. Bogen (Berlin)

834. Weimer, H., Wesen und Arten der Fehler. *Zeits. f. pädag. Psychol.*, 1922, **23**, 17–25.

Der Irrtum ist ein seelischer Zustand, ein Fürwahrhalten des Falschen, das bedingt ist durch die Unkenntnis gewisser Tatsachen, die für die richtige Erkenntnis von wesentlicher Beduetung sind. Dem gegenüber ist der Fehler eine Handlung, die gegen die Absicht ihres Urhebers von Richtigen abweicht und deren Unrichtigkeit bedingt ist durch ein Versagen psychischer Funktionen. Im Versagen von inneren Funktionen liegt auch die Abgrenzung des Fehlers gegen den Begriff Handlungsstörung, die durch äussere Ursachen bedingt wird. Für die Fehlerentstehung in Frage kommende versagende psychische Funktionen sind: Aufmerksamkeit, Gedächtnis, Wahrnehmen und Denken.

H. Bogen (Berlin)

835. Schüssler, H., Die optische Muskeltäuschung als Intelligenztest für anormale Kinder. *Zeits. f. pädag. Psychol.*, 1922, **23**, 25–29.

Nach der Behauptung Demoors verhalten sich 5–6 jährige Kinder beim Anheben oder Lasten zweier gleich schwerer, aber verschieden grosser Gegenstände so, dass die normalen Kinder den kleineren Gegenstand für den schwereren erklären, die anormalen fällen Gleichheitsurteile oder noch häufiger erklären sie den grösseren Gegenstand für den schwereren. Die Nachprüfung an 784 Volks- und Hilfsschülern erweist die Behauptung als irrig. Die optische Muskeltäuschung ist also nicht als Intelligenztest für Hilfsschulkinder brauchbar, da sich kein typischer Unterschied zwischen normalen und Hilfsschulkindern zeigt. Nach den vorliegenden. Versuchen übertreffen die Mädchen die Knaben und die Hilfsschüler die Volksschüler. Die Täuschung ist umso grösser, je grösser der Volumunsterschied ist.

H. Bogen (Berlin)

836. Hische, W., Gedankenordnen. *Praktische Psychol.*, 1922, **3**, 181–186.

Unter Gedankenordnen als Test ist die sinnvolle Aufreihung wirr durcheinander gewürfelter Sätze zu verstehen. Eine Analyse des Tests zeigt, dass er nur im übertragenen Sinne als Ordnungstest bezeichnet werden darf. Die quantitative Analyse ergibt, dass bei derartigen Test eine einfache Punktwertung falsch ist. Es muss vielmehr der relative Schwierigkeitsgrad der testkritischen Punkte zueinander als Gewichtsfaktoren in Rechnung gestellt werden.

H. Bogen (Berlin)

837. Schlag, J., Häufigkeitsproben aus dem Sprachschatze von sechs- bis achtjährigegen Kindern. *Pädag.-psychol. Arbeiten*, 1921, **11**, 1–67.

S. schwebt als Ideal ein Häufigkeitswörterbuch der Kindersprache vor, um so Grundlagen für den Sprachunterricht besonders des jüngeren Kindes zu gewinnen. Der erste Teil der Arbeit beschäftigt sich mit der Sprache Sechsjähriger. Der Zählung liegen Stenogramme über Sprachäusserungen zweier vor dem Schuleintritt stehender Mädchen zugrunde. Im ganzen wurden 27 256 Wörter aufgenommen. Es wird dann hauptsächlich der Wortinhalt des Sammelgutes einer statistischen Bearbeitung unterzogen. Die Einzelwörter werden in Gruppen nach Wortart und Vorstellungskreis ihrer Häufigkeit nach betrachtet. Der zweite Teil enthält den Versuch eines vergleichenden Wörterverzeichnisses der Sprache von sechs- bis achtjährigen Kindern. Eine Zählung über die Verteilung der Wortzahl auf die Sätze spiegelt die Altersentwicklung besonders deutlich wieder. Der Dichtigkeitswert für die Sechsjährigen liegt beim Vierwortsatz, für die Achtjährigen beim Sechswortsatz. Es werden ferner noch sehr sorgfältig durchgearbeitete Vorschläge für die Methode künftiger Häufigkeitsstatistiken des kindlichen Wortschatzes gegeben.

H. Bogen (Berlin)

838. Lobsien, M., Zur Feststellung der Sprachbefähigung bei Volksschülern. *Zeits. f. pädag. Psychol.*, 1922, **23**, 114–116.

Ergebnis einer Nachprüfung des Schlotteschen Prüfverfahrens an Zehnjährigen. Die Nachprüfung ergibt, dass das vorliegende Schema die spezifisch sprachlichen Bedingungen der Sonderanlage nicht voll erfasst.

H. Bogen (Berlin)

839. Schüssler, H., Die Koinstruktion in psychologischer Beleuchtung. *Pharus,* 1922, **13**, 229–234.

Nach kritischer Besprechung der neuesten Forschungen zur Geschlechterpsychologie kommt Sch. zu dem Schluss, bei Aufrechterhaltung der vollen Gleichwertigkeit der Geschlechter und des gemeinsamen Endzieles ist doch wenigstens für die Pubertätszeit eine Verschiedenartigkeit in der Verteilung der Jahrespensen und damit eine Preisgabe des Koinstruktionsprinzipes für diese Zeit gegeben. Ein Ausweg wäre der, die Altersklassen in reine Begabungs- oder Leistungsklassen aufzulösen. Vor und nach der Pubertätszeit sindgegen die Koinstruktion keine Bedenken zu erheben, da aus den Untersuchungen hervorgeht, dass die vorhandenen Unterschiede geringer sind.

H. Bogen (Berlin)

840. Goldbeck, E., Über die Einsamkeit der jugendlichen Seele. *Neue Erziehung,* 1922, **4**, 34–45.

Der vor und während der Pubertätszeit auftretende Hang der jugendlichen Seele zur Einsamkeit wird aus soziologischen Agneigungen des Jugendlichen hergeleitet. Das Wunschbild vom künftigen Sein, das in der Einsamkeit gestaltet wird, lässt sich ohne die Annahme allein Richtung gebender sexueller und erotischer Faktoren verstehen. Der Zusammenhang zwischen all den divergierenden Erscheinungen der Reifezeit ist in einer tieferen und dunkleren Bewusstseinsschicht als es die sexuellen Vorgänge sind zu suchen. Aus ihr gehen sie nur äusserlich getrennt hervor. Ihr innerer Zusammenhang ist in der grossen aber inhaltlosen Liebe, der die jugendliche Seele in jenen Jahren sich weit öffnet, zu suchen. Sie will alle und alles umfassen, stösst aber auf die spröde Welt und zieht sich darum in sich und auf sich selbst zurück.

H. Bogen (Berlin)

841. Hopf, E., Systematische Grundlegung einer psychologischen Einfühlung auf der Unter- und Mittelstufe der höheren Knabenschulen. *Der Aufbau,* 1922, **4**, 1–2, 11–12, 22–23, 26–27.

Die geistige Anlage beduetet einmal den vom objektiven Sachgebiet her beurteilten Einheitszusammenhang psychischer Funktionen und dann den ihre planmassige Veränderlichkeit und Entwicklung bedingenden Richtungsfaktor. Dem entsprechend ist

die psychologische Beurteilung in ihrem analytischen Teil Zuordnung gewisser Fähigkeiten des Subjekts zu gewissen Struktureigenschaften des Objekts. Die psychologische Einstellung findet ihren Abschluss in der synthetischen Betrachtung, die auf der Voraussetzung ruht, dass alle Eigenschaften als Teilausstrahlungen einer einheitlichen psychischen Persönlichkeit erlebt und gewertet werden müssen. In diesem Sinne entrollt der Verfasser ein Bild von den in den einzelnen Unterrichtsgegenständen sich betätigenden psychischen Funktionen, die der Strukturgehalt der Fächer erfordert. In einem psychographischen Schema, das vom Schüler aus orientiert ist, sollen dann die aus der Betätigung am Objekt gefundenen Eigenschaften des einzelnen Schülers zu einem Gesamtbilde vereinigt werden.

H. Bogen (Berlin)

842. Viereck, P., Lateinsche Unterrichtserfahrungen an der Begabtenschule des Köllnischen Gymnasiums. *Praktische Psychol.*, 1922, **3**, 147–150.

Die in experimenteller Fähigkeitsprüfung ausgelesenen Schüler zeigen hervorragende Beherrschung der schwierigen lateinischen Formenlehre, fein entwickeltes Sprachverständnis, starke Selbsttätigkeit und Wissensdurst und unterscheiden sich in all diesem vorteilhaft von den übrigen Gymnasialklassen.

H. Bogen (Berlin)

843. Huth, A., Anleitung zur Schülerpersonalbeschreibung. *Zeits. f. pädag. Psychol.*, 1922, **23**, 97–110.

Der sehr ausführlich gegliederte Beobachtungsbogen fordert Beschreibung der körperlichen Entwicklung, der ausserschulischen Lebenskreise des Kindes, der Lebenskenntnisse und Schulleistungen, der Verstandes-, Gemüts-, Willens- und sittlichen Entwicklung.

H. Bogen (Berlin)

844. Bobertag, O., Zur Frage der psychologischen Schülerbeobachtung im Dienste der Berufsberatung. *Zeits. f. pädog. Psychol*, 1922, **23**, 110–114.

Erörtert die grundsätzlichen Vorbedingungen einer Schülerbeobachtung, deren Ergebnisse tatsächlich praktisch verwendbar sein sollen.

H. Bogen (Berlin)

845. ALTER, W., Zur Erkenntnis abwegiger und krankhafter Geisteszustände bei Schulneulingen. *Zeits. f. pädag. Psychol.*, 1922, **23**, 117–131.

Zusammenfassung der für die Erkennung abnormer Zustände beim Sechsjährigen wesentlichen Symptome und der Methoden zur eindeutigen Festlegung derselben. H. BOGEN (Berlin)

846. LIPMANN, O., Rekrutierung auf psychologischer Grundlage. *Zeits. f. angew. Psychol.*, 1922, **20**, 259–281.

Bericht über die amerikanische Methode der Armee-Intelligenzprüfung und ihre Ergebnisse. H. BOGEN (Berlin)

847. SCHLOTTE, F., Eine experimentelle Auslese an Sprachbefähigten in der Schule. *Zeits. f. pädag. Psychol.*, 1922, **23**, 29–40.

Bericht über die in dem voraufgehenden Referat erwähnte Auslese, erweitert durch den Bericht über die Bewährung der ausgelesenen Schüler. H. BOGEN (Berlin)

848. SCHLOTTE, F., Experimentelle Prüfung von Sprachbefähigten. *Pädag-psychol. Arbeiten*, 1921, **11**, 68–138.

Enthält die Darstellung einer Auslese für in Leipzig eingerichtete Sprachklassen. Das Prüfungsschema ist auf Grund einer Analyse des allgemeinen Bewusstseins gewonnen und dann für die besonderen Zwecke zugeschnitten worden. Lehrerurteil und Testprüfung standen gleichberechtigt nebeneinander. Als neuartig unter den Tests ist der von Handrick ausgearbeitete zur Prüfung der Lautauffassung und Lautdarstellung zu erwähnen. Es soll dadurch die Seite unseres Seelenlebens unter sucht werden, die für die Auffassung der fremden Laute, für die Aussprache und die Rechtschreibung die wichtigste Rolle spielt. Dabei wurde verlangt, sinnlose nach bestimmten Regeln aufgebaute Wörter so aufzuschreiben, dass jederman das Wort so lesen muss, wie es der Versuchsleiter vorgesprochen hat. H. BOGEN (Berlin)

849. MÜLLER, H., Die psychographische Schülerbeobachtung in der Berliner Praxis. *Praktische Psychol.*, 1922, **3**, 213–219.

Wirklich brauchbare Analysen für die Auslese befähigter Volksschüler hat ihre Lehrerschaft nur in etwa 10% der Fälle

geliefert, jedoch ist damit gegen vorher ein Fortschritt erkennbar. Zahlreiche Beispiele der verschiedensten Art sind abgedruckt.

H. Bogen (Berlin)

850. Zingerle, H., Zur gerichtsärztlichen Beurteilung kindlicher Beschuldigungen. *Arch. f. Kriminol.*, 1922, **74**, 161–171.

In allen verdachterweckenden Fällen sollen die Kinder einer ärztlichen Untersuchung unterzogen werden, bei der festzustellen sind: 1. der Geisteszustand, der Zustand des Nervensystems und die Beziehung einer etwaigen Erkrankung zu den Leistungen des Gedächtnisses und von Aussagen, 2. die Leistungsfähigkeit des Gedächtnisses unter besonderer Berücksichtigung vorhandener Suggestibilität, 3. diejenigen Momente, welche die Reproduktion störend beeinflussen konnten. Die Anwendung dieser Methode auf die Aussagen zweier Mädchen, die einen Lehrer eines Sittlichkeitsdeliktes beschuldigten, ergab ihre Unglaubwürdigkeit. Verfasser empfiehlt in solchen Fällen die experimentelle Prüfung der Zeugnisfähigkeit durch die Sternsche Bildaussagemethode, die gegebenenfalls noch durch die Wiedergabe vorgelesener kurzer Erzählungen zu ergänzen wäre.

O. Lipmann (Berlin)

851. Kleinknecht, F., Ist der Neigungsstuhl ein Apprat zum Anlernen von Flugschülern? *Praktische Psychol.*, 1922, **3**, 245–254.

Zur Scheidung von Geeigneten und Ungeeigneten bediente man sich während des Krieges auf einem sächsischen Flugplatz des "Neigungsstuhles." Es ist das ein in sagittaler und lateraler Richtung drehbarer Sitz, der vom Versuchsleiter verstellt wird, und den die Versuchsperson mit einer dem Flugzeugsteuer nachgeahmten Kontaktvorrichtung wieder in die horizontale Nullage verstellen kann. Gute Einsteller lassen sich von schlechten isolieren. Durch Uebung lassen sich die Fehlerzahlen für Einstellung in die horizontale Lage verbessern. Dass gleiche gilt auch für Schieflagen mit einfacher sagittaler Neigung oder mit kombinierter lateral-sagittaler. Die Uebung einzelner Stellungen hat einen Einfluss auf die Einstellung neuer Lagen derart, dass man bei letzteren bereits von Anfang an weniger grosse Fehlerzahlen erhält und eine nur geringe Verbesserung im Vergleich zu dem zuerst geübten feststellen kann. Uebungsfähigkeit ist zu erzielen, die soweit geht, dass man ver-

schiedene geübte Lagen in beliebiger Reihenfolge nacheinander auf Anforderung einzustellen vermag, wobei ebenfalls noch eine Verbesserung durch Uebung möglich ist. Man wird befähigt, schätzungsweise sich über die Steilheit der jeweiligen Lage ein Bild zu machen. Und letztens glaubt man, sich, sofern man lange Zeit mit geschlossenen Augen geübt hat, auf diese Art besser einstellen zu können, so dass man sich bei der Einstellung weniger auf die Orientierung durch das Auge als auf das Lagegefühl verlässt. Der Neigungsstuhl ist also sowohl als Prüfmittel als auch zur Ausbildung von Flugschülern zu verwenden.

H. Bogen (Berlin)

852. Thorndike, E. L., Practice Effects in Intelligence Tests. *J. of Exper. Psychol.*, 1922, **5**, 101–107.

To determine the effect of practice in intelligence tests the author presented to large numbers of college students various forms of a test, somewhat more difficult than the Alpha tests, originally prepared for the United States Air Service. A general weighted average of all the results gives about 8 as the amount gained by practice in the second trial after ten minutes of fore-exercise. Fifteen forms of the test were given successively, one each school day, to twenty gifted children about eleven years old. The curve representative of successive gains indicates that the effect of practice is very slight after the third trial.

C. C. Pratt (Harvard)

853. Rogers, H. W., Some Empirical Tests in Vocational Selection. *Arch. of Psychol.*, No. 49, 1922.

The aim of the investigation was to test out in practice the method of empirical vocational tests and to discover if possible significant tests for specific commercial functions.

Nine tests were used, selected by random from a group of the "Woodworth-Wells Tests." Group I was composed of seventy-seven young men and women studying typewriting, stenography and grammar in Extension Teaching, Columbia University, three evening and one day class. Group II and Group III were 118 typists, women in a large retail commercial concern in New York City. Some of the 118 dropped out, leaving 38 typists in Group II and 65 in Group III. The typists in Group II had been working in the same division for at least ten weeks. Those in Group III had been working in the same division one and a half months and for not longer than six months.

Records of five typists who had been working six to ten months were discarded. Measures of ability in stenography for the students were obtained by the grades A, B, C, D, F, given at the mid-term examination—it was possible to secure an order of merit ranking from 1 to 45, as the marks were subdivided into A+, A, A—, etc., and where more than one received a mark they were ranked within that mark. The grades in grammar examination were turned into per cents and transformed into an order of merit series. In typewriting more objective and reliable grades were measured. Each month a typewriting test was given in which the subjects copied a given piece of material on the typewriter, doing as much as possible in ten minutes. For Group II records of the average number of "sheets" written per day were kept for ten months, from these there were selected the records of what appeared to be the best successive five weeks. In Groups II and III a number of stores in which the subjects worked received all orders by mail and the customers' orders had to have a sheet typed for each store in the concern from which the customer ordered a commodity. This typing was a very particular kind as there were practically no long phrases or sentences. For Group III the average number of sheets written per day during the fifth and sixth weeks of each individual's term of employment were considered. There were wide mental differences among all the persons tested and it appears that the highest and lowest mental grades of girls in the typing profession were included in this experiment. The subjects in Group I were tested within two months after they had started their course. The subjects of Groups II and III were tested after they had acquired considerable speed in typing.

Vocational guidance should mean accurate scientific prediction for each individual. "To establish a system of vocational guidance which is to make no grave errors it will probably be necessary to have a coefficient of correlation well above 90 with a small probable error." From the results of this research, the author predicts that individual A who scores 140 in the psychological tests will most probably attain an ultimate ability in typing of 40 words a minute and in 99.7% of the cases she will attain an ultimate ability in typing varying between not more than 31 to 49 words per minute and individual B who scores 96 in psychological tests will probably attain an ultimate ability in typing 32 words per minute and in 99.7% of all such cases she will attain an ultimate ability in typing varying not

more than between 23 to 41 words per minute. These predictions are of little practical value for the individual. It can be predicted from the data that in all probability A will become a better typist than B but A might develop into a poorer typist than B. The correlations are not high enough and the scatter value is not small enough to warrant the establishment of a system of vocational guidance whereby an individual can be advised, to prepare herself to become a typist. The problem of vocational selection differs from that of vocational guidance in that the former is "given a certain number of applicants in excess of the number required for a specific job, to select those who, *on the whole,* are best fitted to succeed." "If we can have a system of vocational selection which can pick from 20 applicants (10 poor and 10 good men) a majority of the good ones and weed out a majority of the poor ones we have something which works and is valuable." It appears evident from the data that this method of empirical vocational tests gives a far more reliable criterion of vocational selection in the field of typing than has been obtained by any other method.

E. Mulhall Achilles (Columbia)

854. Cobb, M. V., One Element in the Probable Error of a Mental Age Measurement. *J. of Educ. Psychol.,* 1922, **13**, 236–240.

Cobb discusses the error in mental age ratings which is due to the size of the unit of measurement. "The size of the error is dependent on the size of the steps in the scale, its least possible median value being that of half of one step." Thus in the Stanford Revision of the Binet Scale, the minimum median error of a single measurement varies from one month at the lower end to three months at the upper end of the scale." Moreover, the error from this source always lowers the obtained mental age from its true value." The author believes that in extreme cases the error from this source might be as great as one year, or at age six an error of 16 points I.Q.

A. T. Poffenberger (Columbia)

855. Stone, C. L., Disparity between Intelligence and Scholarship. *J. of Educ. Psychol.,* 1922, **13**, 241–244.

Six hundred Dartmouth students were given a percentile rank according to their scholarship grades, and another according to their scores in Army Alpha. The discrepancies in these percentile ranks were calculated and a group of sixty-two cases whose discrepancies

amounted to 50 per cent or more were chosen for study, along with a control group of forty-five cases. These two groups were tested for "assimilation of the environment, their tension and persistence of work and their power of aggressiveness." According to the author, the results "justify the assumption that discrepancies in favor of scholarship (where scholarship rank is higher than intelligence rank) may be measured by some sort of perseverance or tension test, and discrepancies in favor of intelligence (where intelligence rank is higher than scholarship rank) by some test which measures facility in absorbing the environment.

A. T. POFFENBERGER (Columbia)

856. GARRISON, S. C., Additional Retests by Means of the Stanford Revision of the Binet-Simon Tests. *J. of Educ. Psychol.*, 1922, **13**, 307–312.

Records of a total of 468 retests are reported, the interval varying from one to four years. In 55 per cent of the cases the I. Q. rises, the increase being greater among the more intelligent children. "Since there does seem to be a slight gain in the higher classes, it is evident that there is a slight practice effect, that the test is relatively easier in the higher ages, or that the I. Q. actually increases for the higher classes. We feel that there are not enough data available yet to warrant definite conclusions."

A. T. POFFENBERGER (Columbia)

857. DEARBORN, W. F., and LINCOLN, E. A., How the Dearborn Intelligence Examination Standards were Obtained. *J. of Educ. Psychol.*, 1922, **13**, 295–296.

Children in three towns from second grade to high school seniors were tested. Grades for each town were treated separately, and standards at half year intervals were chosen such that the median child at any age should have an intelligence quotient which falls within the normal (I. Q. .90–1.10) no matter which community he happened to live in.

A. T. POFFENBERGER (Columbia)

858. STONE, C. L., The Significance of Alpha in Colleges. *J. of Educ. Psychol.*, 1922, **13**, 298–302.

Six questions concerning the value of Alpha as a college test are answered from a study of about 1250 records of Dartmouth fresh-

men. (1) How does the test correlate with scholarship? The highest correlation was plus .498. (2) Will the test give a prognosis of failures, probation cases and superior scholars? About two and one-half times as many low score men as high score men were eliminated within a year. (3) How does the test correlate with individual subjects of study? As usual the highest r is with English (.497). The other r's range between this point and .111 for graphics. (4) Is there an increasing superiority shown by the test scores as we ascend from E to A in scholarship scores? "There is some superiority of each scholarship grade over the scholarship grade just below." (5) What percentage of exception is there at the high and low end of scholarship scale? 18.2% of A men fall below average Alpha score and 32.8% of E men rose above average Alpha score. (6) What is the diagnostic value of different parts of Alpha for different school subjects? No value is at present to be attached to Alpha as an aid in choice of subjects of study.

A. T. Poffenberger (Columbia)

859. Root, W. T., Correlations between Binet Tests and Group Tests. *J. of Educ. Psychol.*, 1922, **13**, 286–292.

Six hundred children of school grades one to twelve were tested with the Stanford Revision and with thirteen of the group intelligence tests. This report presents correlations of the Binet with each of the group tests. A survey of the coefficients shows that no one group test is best for all grades, but that the test must be chosen according to the particular school grade one wishes to test. The grades are then grouped into sets of four and the correlations for the different group tests calculated. Here also the same test is not always the best for all groups. Cause for the variation of test efficiency from grade to grade is found primarily in the emphasis on different special abilities in the different tests.

A. T. Poffenberger (Columbia)

860. Chapman, J. C., and Dale, A. B., A Further Criterion for the Selection of Mental Test Elements. *J. of Educ. Psychol.*, 1922, **13**, 267–276.

This paper deals with the question of the effect of environmental influence and training on performance in mental tests. A new criterion is proposed which will evaluate test elements with reference to weight placed on hereditary brightness rather than on environ-

mental influence and training on performance in mental tests. A new criterion is proposed which will evaluate test elements with reference to weight placed on hereditary brightness rather than on environmental training. Two groups of children differing in chronological age by an average of five years and making equivalent total scores in the National Intelligence Test are found to attain different scores in the five tests constituting the examination. The opposites test, in which the young group excels, seems to depend to a high degree on native intelligence, while arithmetical problems and substitution depend more upon the environmental factor. On the basis of this study the legitimacy of the I. Q. method of estimating intelligence is called into question.

A. T. Poffenberger (Columbia)

861. Freeman, F. N., Research versus Propaganda in Visual Education. *J. of Educ. Psychol.*, 1922, **13**, 257–266.

Freeman warns of the reaction against visual education which must follow its widespread and uncritical adoption. He shows that visual education, especially in the form of moving pictures, cannot be a cure for all educational ills, and that the function of visual presentation can be determined only through patient scientific research. Specific cases in which this form of instruction is valuable are cited and many questions needing answers are suggested. The whole argument is timely, for the motion picture industry, with only a little encouragement from educators, could soon flood the schools with superfluous and costly equipment.

A. T. Poffenberger (Columbia)

862. Baldwin, B. T., The Relation between Mental and Physical Growth. *J. of Educ. Psychol.*, 1922, **13**, 193–203.

The paper presents data on the analysis and significance of physical growth curves, the interpretation of similar data on mental growth curves, and the relation between physical and mental growth. From the physical growth curves now established, knowing the chronological and physiological ages of a given child, his height at any later age may be predicted within a probable error of known amount. The same kind of prediction for mental traits will be possible as soon as enough cases have been examined over a long period of time. Baldwin believes the prediction of I. Q. to be possible with an error to 4 to 7 points.

For a group of 49 girls the correlation between height and mental age was found to be plus .53 (with chronological age constant). The author makes a plea for "intensive consecutive studies throughout a series of years on the same individuals."

A. T. POFFENBERGER (Columbia)

863. KNIGHT, F. B., Pitfalls in Rating Schemes. *J. of Educ. Psychol.*, 1922, **13**, 204–213.

Two pitfalls in rating schemes are reported: (1) The tendency to overrate oneself in desirable traits, the exaggeration being greater the more desirable the trait. The rating of a group of interests according as one thinks he possesses them, as the ideal individual would possess them, and as the average individual possesses them, and the study of the interrelations among these ratings may be a means of diagnosing such character traits as sentimentality, conceit, peculiarity, etc., which cannot yet be measured more directly.

(2) The overlapping of traits. Whenever several traits are rated by the same judge, the correlations among them are too high, due most probably to the influence of general impression. Knight shows, however, that the degree of overlapping is dependent on the method of obtaining the judgments, so that the interpretation of intercorrelations must be made in the light of the method used to obtain them.

A. T. POFFENBERGER (Columbia)

864. PINTNER, R., and KELLER, R., Intelligence Tests of Foreign Children. *J. of Educ. Psychol.*, 1922, **13**, 214–222.

The Binet examination records of 674 foreign speaking children representing eighteen different nationalities showed a decidedly lower I. Q. than found in an English speaking group from the same schools, "whether because of actual lower intelligence, or because of a language handicap." When the Pintner nonlanguage test was given to a group of these children, the I. Q.'s of both foreign and English speaking children were raised, but the increase was much greater for the foreign speaking. The correlation between Stanford Revision and a series of performance tests was higher for the English speaking than for the foreign speaking, while 23 per cent more foreign speaking than English speaking children had higher scores in the performance tests than in the Binet tests.

A. T. POFFENBERGER (Columbia)

865. KNIGHT, F. B., The Significance of Unwillingness to be Tested. *J. of Applied Psychol.*, 1922, **6**, 211–212.

Sixty-five teachers were given the Thorndike College entrance examination, Part I, and told they could sign their names or not as they preferred. Thirty-nine signed their names, 26 did not. The average score of signed papers was 100, of the unsigned, 75. Only four of the 26 unsigned papers equalled or excelled the average of the signed group. Only five of the 39 signed papers were so low or lower than the average of the unsigned tests.

E. MULHALL ACHILLES (Columbia)

866. TOWN, C. H., A Mass Mental Test for Use with Kindergarten and First Grade Children. *J. of Applied Psychol.*, 1922, **6**, 89–112.

An attempt was made to devise a mass test for kindergarten and first grade children which would bring into play mental activities which Binet found developed in young school children and which would not require verbal or written response from the child. Whenever possible material from the Binet-Simon Intelligence Scale was adopted. The "Cross Out" method was linked with the Binet problems and a "Picture Game" evolved.

The Picture Game consists of a sixteen page picture book, five by seven inches. A reproduction is given in the article. The procedure was to make sure the child knew the meaning of "cross out." After asking the child if he saw a rabbit and a rat, he was told to cross out the rabbit and this was illustrated by the examiner crossing out a rabbit. After two such demonstrations the experimenter was ready to begin Test 1. The first page consisted of four colors, red, blue, green and yellow, and the child was told to cross out red. The second page was similar to the first, but he was told to cross out the blue. Test 2 required the child to cross out the nose of one little girl's picture, the eyes of the second, and the mouth of the third. The tests numbered thirteen, the thirteenth being "drawing the diamond" on an empty page after the experimenter had drawn one on the blackboard. Four hundred nineteen kindergarten children of average age 5.5 and 22 first grade classes containing 778 children of average age 6.9 were tested. The results confirm the impression that the Picture Game is adapted to use with kindergarten and first grade children and that by their use one can obtain a fairly good classification of children of these two grades.

E. MULHALL ACHILLES (Columbia)

867. LAIRD, D. A., Paper and Pencil Research in College Classrooms. *J. of Applied Psychol.*, 1921, **5**, 478–481.

The thesis is that much of the college and normal school students' time in the classroom is exploited by their teachers in paper and pencil research with but meager, if any returns to the student himself.

E. MULHALL ACHILLES (Columbia)

868. GARTH, T. R., The Results of Some Tests on Full and Mixed Blood Indians. *J. of Applied Psychol.*, 1921, **5**, 359–372.

The problem was to find out how mixed and full blood Indians differ in the results of their performance of nine psychological tests. The subjects were 198 males, 77 being mixed blood and 121 full blood Indians, and 186 females, 78 being mixed and 108 full bloods. The ages ranged from 9 to 26, and the educational attainment fourth to tenth grade. The norms are of necessity only tentative until larger groups are obtained. From the data the comparison of the average performance of each group of mixed and full blood individuals for each test shows that the mixed blood excells the full blood in most of the cases. The scores of the mixed blood is favored by superior social status and educational opportunity. Tables giving average, average deviation, probable error and range are included.

E. MULHALL ACHILLES (Columbia)

12. MENTAL EVOLUTION.

869. ALVERDES, F., Studien an Infusorien über Flimmerbewegung, Lokomotion und Reizbeantwortung. *Schaxel's Arbeiten aus dem Gebiete der experimentellen Biologie.* Berlin, 1922. 1–130.

Die Loeb'sche Tropismentheorie wird gänzlich abgelehnt; die Jennings'sche "Versuchs—und Irrtumsmethode" bildet ein viel zu enges Schema. Denn die Infusorien reagieren nicht in stereotyper Weise nach Art kleiner Automaten oder eines "isolierten Muskels" auf die Reize der Umwelt. Vielmehr steht ihnen eine ähnliche Fülle von Antwortmöglichkeiten zur Verfügung wie den höheren Tieren auch.

F. ALVERDES (Halle a. S.)

870. SCHMIDT, B., Von den Aufgaben der Tierpsychologie. *Abhandlungen zur theoretischen Biologie.* Berlin, 1921. S. 43.

Verf. will "unter grundsätzlicher Anerkennung und Betonung der Realität des Psychischen in erster Linie auf vergessene und vernachlässigte Kapitel der Tierpsychologie verweisen" und untersucht in diesem Sinne die körperlichen Ausdrucksformen der höheren Wirbeltiere und die Tiersprache. Zur Festlegung der Ausdrucksformen verwendet er Zeichnungen guter Tiermaler, photographische und kinematographische Aufnahmen. Die "psychische Wesenheit" des Tieres liegt nach Verf. nicht im "Intellektuellen," sondern im "*Instinktiven* und *Triebhaften,* im tierischen *Wollen* und anderen *seelischen* Dingen." Thorndike's Auffassung wird, weil sie der "Einheit der tierischen Psyche" nicht gerecht wird, abgelehnt. Unter den bildlichen Darstellungen sind besonders beachtenswert: tanzende Jungfernkraniche, gespannte Aufmerksamkeit eines Hundes und eines Lamas, Mandrill und Kamel und Marabu in Zorn. Zum Studium der Tiersprache hat Verf. mit Erfolg die phonographische Aufnahme verwendet. Spezialle Resultate werden noch nicht mitgeteilt.

TH. ZIEHEN (Halle)

871. ALVERDES, F., Rassen-und Artbildung. *Abhandl. z. theoretischen Biol.,* Berlin, 1921, S. 117.

Da psychische Eigenschaften nicht berücksichtigt werden, kommen für den Psychologen speziell nur die allgemeinen Ergebnisse in Betracht. Verf. definiert die Vererbung ausschliesslich als "die *genotypische* Uebereinstimmung aufeinander folgender Generationen," eliminiert also den *Phaeno*typus (Johannsen) ganz aus der Definition. An zahlreichen Beispielen wirs auseinandergesetzt, wie Variationen des Geno- und Phaenotypus entstehen können, und allent halben auf die grossen Lücken unserer Erkenntnis hingewiesen (Rolle der geschlechtlichen Zuchtwahl, Ursprung der genotypischen Aenderungen usf.).

TH. ZIEHEN (Halle)

872. KÜSTER, E., Botanische Betrachtungen über Alter und Tod. *Abhandl. z. theoretischen Biol., Heft* 10. Berlin, 1921, S. 44.

Im Hinblick auf die Erscheinungen der Senilität im psychischen Leben ist die Schilderung der Veränderungen im Gewebe

alternder Pflanzen (S. 7 ff.) für den Psychologen nicht ganz ohne Interesse. Verf. stellt die Hypothese auf, dass, "wie ein Organismus durch seine Stoffwechselprodukte seine Umgebung langsam vergiftet, so auch seinen eigenen Vegetationskörper oder wenigstens diejenigen seiner Teile vergiftet, die der Intoxikationsgefahr aus inneren oder äusseren Gründen am meisten ausgesetzt sind," und dass diese Vergiftung zu den Erscheinungen des Alterns und event. zum Tode führt. Wachstum und Befruchtungsvorgänge scheinen dem Altern entgegenzuwirken. Auch die Beziehungen zwischen Differenzierung und Altern werden kurz besprochen.

TH. ZIEHEN (Halle)

873. REINKE, J., Besitzt ein Vogel Einsicht in kausale Zusammenhänge? *Naturwiss. Wochenschr.*, 1922, **20**, 742–745.

Verf. hat an einem im Käfig gehaltenen Papagei beobachtet, wie dieser, um seinen Instinkt zu befriedigen, der ihn dazu trieb, seinen Schlafplatz so hoch wie möglich zu wählen, seinen Sitzbügel allabendlich zwischen zwei Gitterstangen des Käfigs befestigte. Verf. meint, auf Grund dieser beobachtung dem Papagei einsichtiges Verhalten zuschreiben zu müssen. Als das Einsichtige an dem Gebahren bezeichnet R. die zweckmässige Weiterverwendung eines erstmalig zufälligen Geschehens durch den Vogel, das Wissen um das Zusammenwirken von Schnabel und Beinmuskulatur zum Heben und Befestigen der Schaukel und das Wiederlosmachen der Schaukel am Morgen für ihre Spielfunktion am Tage.

H. BOGEN (Berlin)

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Special attention is invited to the work of the summer quarter, which begins June 19th and ends September 1st. For information regarding this and other work of the department, and also concerning fellowships, address

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The History and Psychology of Education. Second term (3). Professor Brigham. (P. B.)

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THE PSYCHOLOGICAL BULLETIN

1. GENERAL

874. Sillitoe, A. G., A Portable Choice Reaction Time Apparatus. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 147–149.

Description with drawing of a small electrically controlled multiple choice reaction apparatus for utilizing a stop watch reading to 1/100 second.

S. W. Fernberger (Pennsylvania)

875. Chapman, J. C., Cumulative Correlation. *J. of Exper. Psychol.*, 1922, **5**, 263–269.

Author treats of weights which should be applied to variables in a series of tests in order to secure maximum correlation.

C. C. Pratt (Harvard)

876. Monroe, W. S., The Use and Interpretation of Coefficients of Correlation. *Sch. and Soc.*, 1922, **16**, 288–292.

Two conditions affect the coefficient, namely, the selection of the population and the range of the magnitude of the traits. Within several grades, coefficients may range from —.12 to .57, whereas the coefficient for all grades combined may reach .76. With mental and chronological ages, we have negative coefficients for the separate grades, but a positive for all grades combined. The meaning of a coefficient, *i.e.*, whether it is high or low, depends upon the relationship being studied, *i.e.*, whether any relationship at all exists or how far the relationship is from being perfect. In the latter case the probable error of estimate is recommended. A table of coefficients of the probable error of estimate for all values of r is given.

R. Pintner (Columbia)

2. NERVOUS SYSTEM

877. Hyslop, T. B., Venous Stasis. *J. of Ment. Sci.*, 1922, **68**, 144–153.

This is a study of the mechanism of "supply and demand" occurring within the skull. There are two main questions to be investigated: (1) Is the brain a generator, or merely a transmitter of energy? (2) Is the sum total of the intercranial contents capable of variation in amount? The author discusses these questions at some length and then gives a summary of the causes of active and passive congestion within the skull. The former, he says, may be due to any one of a number of causes, among them overaction of the heart, inflammation, sudden contraction of the arterioles elsewhere, dilatation of the arterioles, plethora, tumors and focal lesions. The latter, he says, is always produced mechanically by some obstruction to the return of blood.

He mentions the value in aiding the circulation of massage, certain rhythmic exercises, and adjustment of balance in the glandular functions.

R. E. Leaming (Pennsylvania)

878. Blachford, J. V., The Functions of the Basal Ganglia. *J. of Ment. Sci.*, 1922, **68**, 153–157.

A report is made of a search of hospital postmortem records, covering a period of twenty years, in cases where the lesion could be definitely located in the basal ganglia. The following résumé is given: Optic thalamus—Three cases: All dementia—no paralysis noted, no convulsions or fits. Optic thalamus and corpus striatum—Three cases: One dementia; one seizures—paralysis, dementia, speech much affected; one seizure—strong convulsions. Corpus striatum—Ten cases: Four speech affected; one hallucinations of sight and hearing; one epilepsy—dementia, destructive; one fits, two or three years before admission; one left-sided convulsions; one epileptiform fits; one pupils normal—knee-jerks present. Internal capsule—One case: Aphasia, hemiplegia, loss of sensation.

The author says that we can only think in terms of muscular energy; in other words, all thought is an incipient muscular contraction, due to mild stimulation of those cells which receive the sense of muscular contraction when certain muscles are used, either to pronounce the name of the thing thought, or to adjust the eyes or other parts of the body in perceiving the object, or, performing the action.

This stimulation, if carried still further, issues in action, viz., the contraction of those muscles used in pronouncing the name or performing the act, of which these cortical cells are the sensory representatives. Associated sensations giving rise to a perception leave the thalamus and reach the corpus striatum. Here they are associated with the muscle sense, which arises whenever the object is perceived and its name pronounced, a mental picture consisting of this muscle sense being thereby projected on to the cortex. In lesions of this body giving rise to a disassociation, or rather to want of association of these sensations, no picture is so formed, and so there is a forgetfulness of the name required, although the object and its use may be recognized, hence visual aphasia. In the same way, should the part concerned with the association of sound and the muscle sense be involved, word-deafness will result, although the patient hears perfectly well what is said to him, the failure being in that part of the nervous center in which the sound is associated with the muscle sense, so that the muscle sense cells in the cortex corresponding to the sound are not stimulated and the consequent mental picture is not formed.

The optic thalami are chiefly the association centers of the primary senses of sight, touch, hearing and smell, and their involvement is accompanied by impairment of those associations which give rise to the perception of things in the outside world. The corpora striata are essentially the centers for the association of the muscle sense with the others giving rise to a great part of our subject consciousness, making speech and thought as we know it possible. In lesions of these structures we have the phenomena of visual aphasia, word-deafness, inability to call up words and names at will, and various difficulties and irregularities of speech and thought due to want of association of the primary senses with the muscle sense. It is probable that these bodies have other functions as well, almost certainly associated with the motor system. Only careful and prolonged investigation will enable this to be solved. Experiments are useless, and clinical, pathological and anatomical research will have to be relied on.

R. E. Leaming (Pennsylvania)

879. Uyeno, K., The Sympathetic Innervation of the Skin of the Toad. *J. of Physiol.*, 1922, **56**, 359–366.

The origin from the spinal cord of the secretory fibers of the skin glands of the toad was investigated. The second to seventh nerves

constantly contain such fibers. The overlapping of the areas of skin supplied by the successive nerves is great.

J. E. Anderson (Yale)

880. Trevan, J., and Boock, E., The Effect of Section of the Vagi on the Respiration of the Cat. *J. of Physiol.*, 1922, **56**, 331–339.

The effects of removing the brain of the cat from in front of the anterior colliculi, from a section between the colliculi, and from back of the posterior colliculi, upon respiration are studied. The effects are similar to those produced by very light anesthesia, moderate anesthesia, and deep anesthesia respectively.

J. E. Anderson (Yale)

881. Wilkinson, G., A Note on the Resonating System in the Cochlea, with Demonstration of a Model, illustrating the Action of a Hitherto Neglected Factor. *J. of Physiol.*, 1922, **56**, ii–iv.

The writer contends that basilar fibers are differentiated progressively with reference to mass, as well as to length and tension. He describes a model of a portion of the cochlea to demonstrate this factor.

J. E. Anderson (Yale)

882. Hill, A. V., The Maximum Work and Mechanical Efficiency of Human Muscles and Their Most Economical Speed. *J. of Physiol.*, 1922, **56**, 19–41.

An instrument is described by means of which the maximum work of human muscles (biceps and brachialis anticus) can be determined. As the mass of the load increases, the maximal work increases also, at first rapidly and then more slowly, tending to reach a definite value equal to the potential energy set free. In a maximal effort the duration of the shortening may be changed by changing the load. The mechanical efficiency of human voluntary movement is discussed. It is shown that there is a certain optimum speed of movement below which the efficiency falls slowly and above which it falls rapidly. The mechanical efficiency of a submaximal effort is always less than that of a maximal effort occupying the same time, and in general the stronger effort is the more efficient. Moreover, the stronger effort has the greater optimum speed.

J. E. Anderson (Yale)

883. Adrian, E. D., and Forbes, A., The All-or-Nothing Response of Sensory Nerve Fibers. *J. of Physiol.*, 1922, **56**, 301–329.

Hitherto the evidence for the all-or-nothing principle has been obtained almost exclusively on the motor nerve fibers of the frog. This investigation was undertaken to determine whether the relation holds good for afferent as well as for efferent fibers. Impulses set up in the internal saphenous (of the cat) by stimuli of different strength are all equally capable of passing through a narcotized region. When conduction fails for an impulse set up by a weak stimulus it fails also for a strong stimulus. The size of the impulse is therefore independent of the strength of the impulse in the sensory as in the motor fiber. The response of a sensory nerve trunk to a single momentary stimulus may vary in two ways, (*a*) a strong stimulus will excite more fibers than a weak, and (*b*) a stimulus which is more than strong enough to excite all the fibers may set up two or more impulses in each fiber. The response to stimuli of different strength was measured in different parts of the arc which is concerned in the flexion reflex of the spinal cat. With reflex stimulation the response of the muscle agrees very closely with that of the afferent nerve, and the gradation seems to depend on (*a*) the number of nerve fibers stimulated, and (*b*) the repeated excitation by strong stimuli. When the motor nerve is stimulated the muscle does not give more than a single maximal twitch although the stimulus may be strong enough to give a double response in the nerve. Probably the second impulse has no effect because it reaches the muscle at a time when the latter is still in the absolute refractory state. In the reflex arc, a second impulse due to strong stimulation of the afferent nerve has more chance of affecting the muscle owing to delay at various synapses, etc. A single impulse in the afferent nerve may sometimes evoke two or more impulses in the efferent side of the arc. Whether it does so or not, depends on the condition of the spinal centers. In general the reactions of the reflex arc support the view that the large majority of sensory fibers react according to the all-or-nothing principle.

J. E. Anderson (Yale)

884. Langley, J. N., The Nerve Fiber Constitution of Peripheral Nerves and of Nerve Roots. *J. of Physiol.*, 1922, **56**, 382–395.

Cutaneous nerves contain many nonmyelinated fibers, the nerves to skeletal muscles contain few. The result in not in favor of the

theory that the nonmyelinated fibers have any considerable connection with striated muscle fibers. All anterior roots of the spinal nerves are distinguished from the posterior roots by their containing a large proportions of fibers 13 μ and more in diameter and a relatively small number of fibers of about 7.5 to 11 μ. These differences are most distinct in the lower cervical and lower lumbar regions. The different roots of a nerve fiber vary in constitution; some have many small fibers—up to about 6 μ—and others very few. The arrangement of fibers in bundles depends chiefly upon their number. Very few nonmyelinated fibers and probably none enter the spinal cord in the posterior roots. In the posterior roots of the nerves, the anterior roots of which have no automatic fibers, there are a considerable number of fibers about 5 μ in diameter with a less number about 3 μ in diameter. In the posterior roots of the nerves, the anterior roots of which have autonomic fibers, there is a great increase in the number of 3 μ fibers but not in that of 5 μ class of fibers. It is suggested that the 3 μ fibers in all the posterior roots are the afferent fibers of unstriated muscles and glands. The anterior roots of the nerves which contain autonomic fibers have fibers of the size of the larger preganglionic autonomic fibers (3.8 to 4 μ) but expressively few, if any, of the size of the smaller autonomic fibers (2 to 3 μ). A large factor in determining the size of nerve fibers is the nature of the tissue with which they are connected.

J. E. Anderson (Yale)

885. Horrax, G., A Consideration of the Dermal Versus the Epidermal Cholesteatomas Having Their Attachments in the Cerebral Envelopes. *Arch. of Neurol. and Psychiatry,* 1922, **8**, 265–285.

The article begins with a discussion of the terminology used in the description of the tumors under discussion, and followed by a historical sketch of these growths, with references to the literature of the subject. Mention is made of the frequency of the two main types, the dermoid and the epidermoid, and of their locations. Two cases from the literature are recited (Bostroem's and Teutschlaender's cases), illustrated by cuts. The three cases from the clinic of Dr. Harvey Cushing, which form the basis of the article, are fully presented, illustrated by gross and histological photographs and roentgenograms. The following summary is appended. "There is group of rare tumors of the intracranial cavity which represent fetal

epiblastic inclusions, sometimes of the epidermal layer alone, and sometimes including also the dermal layer. These tumors may or may not contain hair and other tissue elements, according to the depth of the cell layer represented in the inclusion. It is convenient to group all these tumors under the name cholesteatomas, either hair-containing or nonhair-containing. Three examples of the hair-containing variety, or intracranial dermoids, are presented for consideration, and in two of the patients the tumors were removed by operation, in one of them with apparent success."

D. A. MACFARLANE (Boston Psychopathic Hospital)

886. HILTON, WM. A., The Nervous System of *Phoronida*. *J. of Comp. Neurol.*, 1922, **34**, 381–389.

This interesting, primitive sea animal possesses a crudely centralized nervous system, part of which is separated from the epithelium. Tentacles and body-part have bipolar sense cells, arranged in little groups. Under the influence of an anesthetic the tentacles recover last and are affected first. The body or stem is the last region to suffer from anesthesia. The movements of Phoronis, as studied in the laboratory, are ciliary currents on the tentacles, probably not under nerve control; contractions of the tentacles at least partly under nerve control; contractions of the body stimulated through the surface of the body at almost any point, especially by tactile stimuli just below the tentacles.

R. H. WHEELER (Oregon)

887. MOODIE, R. L., On the Endocranial Anatomy of some Oligocene and Pleistocene Mammals. 25 figures. *J. of Comp. Neurol.*, 1922, **34**, 343–380.

A study of nineteen endocranial casts from the White River beds of South Dakota, ranging from Lower to Middle Oligocene, together with two Pleistocene casts from southern California. Rodentia, Insectivora, Carnivora, Cynoidea and Arteidactyle were represented. There has been little or no cerebral development in rodents since Oligocene times. The Insectivora have retrograded in gross cerebral structure as is shown by a more expansive neopallium in Oligocene forms. Some Carnivora show considerable evolution in the complexity of cerebral pattern and in the greater overhang of the cere-

brum over the cerebellum. Of interest is the fact that primitive horses had unusually well developed brains compared with other Oligocene Mammalia.

R. H. Wheeler (Oregon)

888. Ross, L. S., Cytology of the Large Nerve Cells of the Crayfish (*Cambarus*). *J. of Comp. Neurol.*, 1922, **34**, 37–72.

Much of the cytology of nerve cells offers the perplexing problem: Are we observing structures that are present as such in the living organisms or are we observing artefacts brought about by chemical reagents? By means of intravitam staining the experimenter found some evidence of neurofibrillæ in the living cytoplasm of Cambarus nerve cells. Axones were found to originate deep within the cell body by convergings of neurofibrillæ. These minute structures were widely distributed elsewhere in the cytoplasm, almost surrounding the nucleus. No trace was discovered of Nissl bodies in living cells but this fact does not preclude the possibility that the Nissl chemical substance, chromidial, exists in living nerve cells. The author inclines to the view that Nissl bodies, themselves, are artefacts. Mitochrondria were readily demonstrable in cell bodies and along the course of the fibers. No Golgi internal reticular apparatus was found. Trophospongium shows connection with the sheath cells and consisted of delicate filaments penetrating even to the center of some cells.

R. H. Wheeler (Oregon)

889. Hines, M., Studies in the Growth and Differentiation of the Telencephalon in Man. The Fissura Hippocampi. *J. of Comp. Neurol.*, 1922, **34**, 73–171.

This is an elaborate study of eight embryos from 11.8 to 43.0 millimeters in length, together with considerable other material for reference. Differentiation does not follow any logical order and is subject to different rhythms of acceleration in different regions. The developing neopallium apparently acts as a disturbing factor, obscuring phylogenetic order or patterns of growth. Before this disturbance takes place certain features of growth in the fissura hippocampi suggest phylogenetic history. The initial differentiation of the neopallium runs behind the hippocampus but subsequently surpasses the latter. The author found some confirmation of Herrick's

quadrant theory of telencephalic evagination. A brief review can in no way indicate the great detail to which the investigation was carried.

R. H. Wheeler (Oregon)

890. Bartelmez, G. W., The Origin of the Otic and Optic Primordia in Man. *J. of Comp. Neurol.*, 1922, **34**, 201–232.

The earliest sensory anlage to develop in man is the otic plate, recognizable in an embryo of two to three somites. A four-somite embryo shows the beginning of the associated acousticofacial ganglion, though the fate of this structure, subsequently, is unknown. Between the 10 and 12 somite stages invagination begins and there is a deep otic pit at 16 somites. The "optic-crest primordium" is derived from a fusing of structures along a ridge of isolated growth-centers or thickenings of the cranial neural folds. This appears at 17 and 18 somites, the earliest stage at which the optic anlage has been recognized in a mammal. In man only does the otic precede the optic anlage. Evidence verifies the conclusion that the optic vesicle is derived entirely from the central nervous system.

R. H. Wheeler (Oregon)

891. Black, D. O., The Motor Nuclei of the Cerebral Nerves in Phylogeny. A Study of the Phenomena of Neurobiotaxis. IV. Aves. *J. of Comp. Neurol.*, 1922, **34**, 233–275.

The first three papers of this series appeared as follows: On fishes, this Journal, **27**; the second on amphibia in **28**; and the third, on reptilia, in **32**. The fifth to seventh motor nuclei are associated in a fashion peculiar to aves. Apparently this is due to the fact that sensory impulses from the trigeminal and facial nerves exert a dominating influence over the facial and trigeminal musculature, thus bringing the motor nerves five to seven in close interrelation. Another peculiar feature in aves is a close association of the glossopharyngeal with the dorsal, motor, vagal nuclei. The ninth and tenth motor nuclei are thus associated together and are located in a neighborhood of the chief sensory centers which reflexly act upon them. These considerations point, the author believes, to Kapper's neurobiotactic law. Nuclei ten to twelve form a motor complex, unique among vertebrates, due to similar reasons. Parrots differ from other birds in having a greater development of the hypoglossal component of this complex. Coincident with this is an exceptional development of

intrinsic tongue musculature in parrots. Oculomotor nuclei in birds have differentiated almost to the extent of mammalian development. Certain reptiles show this high degree of differentiation. Thus we have evidence of a ground plan developing within the class from whose prototypes both avian and mammalian forms were evolved.

R. H. WHEELER (Oregon)

892. BURR, H. S., The Early Development of the Cerebral Hemispheres in Amblystoma. *J. of Comp. Neurol.*, 1922, **34**, 277–302.

This paper furnishes added detailed knowledge concerning the rostral relations of the longitudinal zones in the neural tube; information which has been the subject of controversy since the original suggestions of his about 1890.

R. H. WHEELER (Oregon)

893. KUNTZ, A., Experimental Studies on the Histogenesis of the Sympathetic Nervous System. *J. of Comp. Neurol.*, 1922, **34**, 1–36.

R. H. WHEELER (Oregon)

894. RUEDEMANN, R., Further Notes on the Paleontology of Arrested Evolution. *Amer. Nat.*, 1922, **56**, 256–272.

R. H. WHEELER (Oregon)

895. WRIGHT, S., Coefficients of Inbreeding and Relationship. *Amer. Nat.*, 1922, **56**, 330–338.

R. H. WHEELER (Oregon)

3. SENSATION AND PERCEPTION

896. GILLILAND, A. R., and JENSEN, C. R., The Reliability of the Seashore Phonograph Record for the Measurement of Pitch Discrimination. *J. of Exper. Psychol.*, 1922, **5**, 214–222.

The scores made by forty-three college students in Seashore's phonographic test for pitch discrimination were compared with the scores obtained by the same students in a test of pitch discrimination in which mounted tuning forks with resonators actuated by pianoforte hammers were used as sources of sound. The latter method

yielded results which averaged 7.9 per cent higher than those of the former. Mounted as against unmounted forks showed a 2.5 per cent gain in accuracy. C. C. PRATT (Harvard)

897. WEISS, A. P., Discussion: The Stimulus Error. *J. of Exper. Psychol.*, 1922, **5**, 223–226.

Author directs a polemic against Professor Fernberger's article (*J. of Exper. Psychol.*, 1921, **3**, 63ff) on the "stimulus error" in which weight discrimination is shown to be a complex perceptual integration of tactual and kinesthetic processes. The writer complains that Fernberger is unfair to behaviorism when he asserts that a purely statistical interpretation of the reaction of weight discrimination is futile, for the computation of a limen for lifted weights as usually discriminated by postoffice clerks and housewives yields data just as valid psychologically as those reactions secured from a graduate student in a psychological laboratory who discriminates *attitudes* in addition to weights. The implication that a limen secured by an univocal determination of *process* is the true limen of weight discrimination would be taken seriously by no behaviorist. To the behaviorist such a limen does not represent weight discrimination at all, but merely the ability of a subject to "abstract sensation." The writer regards such an ability as an abnormal supplementary speech reaction of the same nature as illusions and dreams, although admitting that such reactions may be made relatively stable and amenable to systematic investigation.

C. C. PRATT (Harvard)

898. HARTRIDGE, H., A Vindication of the Resonance Hypothesis of Audition. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 142–146.

An attack on the Wrightson theory of audition in which the correlation of the physics and perception of the change of a vibrating resonator can be explained by a resonance but not by a displacement theory. S. W. FERNBERGER (Pennsylvania)

899. SCARLETT, H. W., and INGHAM, S. D., Visual Defects Caused by Occipital Lobe Lesions. *Arch. of Neurol. and Psychiatry*, 1922, **8**, 225–246.

The writer begins with a few references to other researches, continues with the clinical pictures presented by the thirteen cases under observation, together with charts of the brain lesions and of the visual fields as obtained by the self-registering perimeter, and draws the

following conclusions: (1) Unilateral occipital lesions commonly result in homonymous hemianopsia, the blind field of each eye being limited by an approximately vertical line passing close to the fixation point. (2) Unilateral occipital lesions do not result in a loss of fixation nor the reduction of acuity of central vision of either eye. (3) Central vision is represented in the apexes of the occipital lobe. (4) Unilateral lesions at a distance from the occipital pole may result in approximately symmetrical paracentral scotomas. (5) Visual defects caused by lesions of the occipital lobes are approximately symmetrical but not exactly superimposable. (6) The macula is a central area of high visual acuity, not sharply circumscribed, extending a short distance from the fixation point which probably represents less than one degree in the arc of the visual field. (7) The hypothesis is suggested that a minute overlapping of innervation exists along the entire vertical line, separating the retinal halves. Each half of the macula is thus in relation with the corresponding occipital cortex, and the fixation point, situated on the line of division, possesses bilateral cortical connections.

D. A. Macfarlane (Boston Psychopathic Hospital)

900. Cobb, P. W., Individual Variations in Retinal Sensitivity, and their Correlation with Ophthalmologic Findings. *J. of Exper. Psychol.*, 1922, **5**, 227–246.

Tests for monocular and binocular sensitivity, by a method previously described by the author, were made upon 101 subjects with the view to determine the reliability of the tests and the relation of the results to the findings of ophthalmologic examinations. The records reveal the fact that individual differences exceed the variations of results of any one subject, even after practice has proceeded through four consecutive tests. It appears that there is little, if any, relation between visual defects as found by ophthalmologic examinations and retinal sensitivity, unless the defects are large and numerous. Binocular acuity is dependent chiefly upon the eye of better vision, whereas binocular sensitivity is more dependent on the visual acuity of the eye with poorer vision.

C. C. Pratt (Harvard)

901. Hartridge, H., A Criticism of Wrightson's Hypothesis of Audition. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 248–252.

Criticism of one of the essential points of Wrightson's displacement theory of audition, namely, "there are impulse points in any

train of sound vibrations, the time intervals between which approximate closely not only to those occurring in the individual tones which together set the air in vibration, but also to their summation and difference tones."

S. W. Fernberger (Pennsylvania)

902. Granit, A. R., A Study on the Perception of Form. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 223–247.

Experimental investigation of Watt's integrations in the field of visual perception. The figures were exposed 1/10 second by a tachistoscope and were of three sorts: (1) Figures of familiar objects, (2) simple forms without any direct resemblance to familiar objects, and (3) complex figures drawn without any plan. Subjects unpracticed in introspection were used and so the report took the form of a drawing by the subject as well as the verbal report. The number and sorts of associations are tabulated. The author believes that chance plays a very important part in the children's constructions, rough associations of similarity mediating the transition to images that are for some reason or other easily brought to consciousness. In adult, there is usually a method in reproducing the designs and observation is better and the capacity of concentration greater.

S. W. Fernberger (Pennsylvania)

903. Cosens, C. R. G., and Hartridge, H., A Vindication of the Resonance Hypothesis of Audition. IV. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 48–51.

The fact that with pure tones, free from harmonics, change of phase does not audibly affect the quality of the mixed tone is advanced as evidence that harmonic analysis takes place in the ear, such as would be performed by resonators.

S. W. Fernberger (Pennsylvania)

904. Hartridge, H., A Vindication of the Resonance Hypothesis of Audition. V. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 185–194.

The author believes that the experimental evidence is in favor of a resonance theory of audition with regard to the following points. The tuning coefficients and persistence coefficients of resonators of different pitch are inversely proportional to one another. The tuning

and persistence coefficients of the ear for the perception of notes of different pitch are inversely proportional and therefore the ear must contain resonators.

S. W. Fernberger (Pennsylvania)

905. Bartlett, F. C., and Mark, H., A Note on Local Fatigue in the Auditory System. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 215–218.

Flügel had shown that in experiments of binaural localization there is a displacement of the tone if it is preceded by a period of uniaural stimulation. Flügel explains this displacement in terms of local fatigue. The authors point out, on the basis of experimental work, that the situation is much more complicated than this explanation indicates.

S. W. Fernberger (Pennsylvania)

4. FEELING AND EMOTION

906. Wallis, W. D., Why Do We Laugh? *Sci. Monthly*, 1922, **15**, 343–347.

Laughter is essentially a social phenomenon and social in origin, operating as a means of expressing and maintaining the group standard. Examples from primitive group life show laughter as a means of holding in check tendencies to depart from it; and laughing at our fellow man seems conditional on our recognizing that "he knows better, or ought to."

J. F. Dashiell (North Carolina)

907. Prideaux, E., Expression of Emotion in Cases of Mental Disorder as Shown by the Psychogalvanic Reflex. *Brit. J. of Psychol., Med. Sec.*, 1921, **2**, 23–46.

Defining emotion as a "subjective feeling consisting of central excitement and consciousness of visceral sensations," the author believes that the psychogalvanic reflex gives a crude indication of the intensity of emotions. As a result of an experimental study, he finds that there is considerable variation in the same subject due to such causes as fatigue, alcohol and the like. In cases of definite cortical degeneration or maldevelopment, the reflex is very small. The view of James and Janet that the emotions of the hysteric are largely artificial is probably correct.

S. W. Fernberger (Pennsylvania)

908. INMAN, W. S., Emotion and Eye Symptoms. *Brit. J. of Psychol., Med. Sec.*, 1921, **2**, 47–64.

Clinical study of cases of glaucoma, unequal pupils, watering of the eyes, squint and the like which seemed to be associated with or caused by emotional stress.

S. W. FERNBERGER (Pennsylvania)

909. SMITH, W. W., A Note on the Use of the Psychogalvanic Reflex. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 282–288.

One difficulty in the use of the psychogalvanic reflex is that of making comparable with one another the reactions observed in different subjects and on different occasions. The question of correction to compensate for variations in the initial resistance of the skin is discussed.

S. W. FERNBERGER (Pennsylvania)

910. NONY, C., The Biological and Social Significance of the Expression of the Emotions. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 76–91.

Speculative article starting with a classification of emotions on the basis of expression with emphasis on the secretions. The social and biological significance of these expressions are noted. It is argued that all this applies equally well to a theory of the origin of language. Language must be formed by the continuation of the evolution of the expression of the emotions from the biological to the social. The emotional mimicry empties itself more and more of its affective contents and becomes a mere symbol—the language of gestures. On the other hand, the emotional reactions specializing in cry, which itself became intelligent and more and more complicated, developed into spoken language.

S. W. FERNBERGER (Pennsylvania)

911. RIVERS, W. H. R., TANSLEY, A. G., SHAND, A. F., PEAR, T. H., HART, B., MYERS, C. S., The Relations of Complex and Sentiment. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 107–148.

Symposium by members of the British Psychological Association. A series of attempts to define these two terms.

S. W. FERNBERGER (Pennsylvania)

912. SHAND, A. F., Suspicion. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 195–214.

Article written in 1916 during the war. An attempt to analyze the attitude of suspicion. Suspicion tends to destroy social intercourse and the wider it spreads the more it paralyzes the life of the community. It also tends to prevent our being taken by surprise on the approach of danger by rendering us prepared in advance to adopt, at the right moment, the right action. The author believes that it has an emotional basis. The analysis of this emotional aspect is attempted.

S. W. FERNBERGER (Pennsylvania)

5. MOTOR PHENOMENA AND ACTION

913. CASON, H., The Conditioned Eyelid Reaction. *J. of Exper. Psychol.*, 1922, **5**, 153–196.

Since the eyelid reaction may be controlled voluntarily to some extent, the speed with which a subject was *able* to wink in response to an auditory stimulus was compared with the time which elapsed between the reception of a conditioning stimulus and the resultant eyelid reflex, the assumption being that if the time of the latter is faster than the former, one is in the presence of a reaction not voluntarily controlled. The time was measured with a Bergström chronoscope which was electrically connected with a thin aluminum lever attached to the observer's eyelid. The fundamental stimulus consisted of a current from an induction coil applied to a branch of the third cranial nerve in such a manner as to bring out most effectively the lid reflex; the click of a relay served as an auditory conditioning stimulus. The data used in working up the results were obtained from measurements of the speed of winking to the shock, with and without the auditory stimulus, and to the auditory stimulus with the shock eliminated, both before and after the training period. With most subjects it was possible to secure conditioned reflexes of the eyelid to sound which were considerably faster than voluntary reactions. For one subject, *e.g.*, the average *voluntary* reaction time was 263.6 sigma, whereas the *conditioned* reaction time was 144.3 sigma. The experimental procedure indicated that the intensity of a sound used for a conditioning stimulus should be just below the threshold of the natural reflex wink at the beginning of the training period. There is some evidence for believing that a reflex cannot be established when the conditioning stimulus comes after the fundamental stimulus.

C. C. PRATT (Harvard)

914. Morgan, C. L., Instinctive Behavior and Enjoyment. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 1–30.

It is assumed that instinctive behavior has an inner aspect of instinctive enjoyment or, in other words, it is conscious behavior with which the author deals. In the study of animal life there are very few instances where the behavior is entirely instinctive, *i.e.*, in which part of the reaction has not been learned by the individual. Instinctive knowledge and instinctive prevision are, however, inferences in the opinion of the author. The relation of instinct to intelligence in the individual and in the race is discussed. Disposition does, however, occur and this is in the nature of preparedness. In the final section, various questions are raised and answered in an effort to find the place of instinct in the evolutionary story of life and of consciousness.

S. W. Fernberger (Pennsylvania)

915. Lavin, C. R., A Preliminary Study of the Reproduction of Hand Movements. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 47–52.

The movements were learned and reproduced with right and left hands and with the eyes both open and closed. It was found that in the beginning all of the subjects attended to the form of the movement rather than to its extent. The points of movement most speedily and accurately learned were the beginning and end and wherever sharp changes of direction occurred. If the eyes were closed during learning or reproduction or both the learning was retarded. Different forms of hand movement were very readily coalesced or "condensed." Guiding the subject's hand during the learning retarded the acquisition. The use of right or left hand does not affect the rate of learning. The most favorable methods of learning and the time relations of learning and reproduction are discussed. Learning and reproducing with eyes closed showed a striking diminution of the size of the reproduction. General suggestions are given.

S. W. Fernberger (Pennsylvania)

916. Brown, W. L., The Influence of the Endocrines in the Psychoneuroses. *Brit. J. of Psychol., Med. Sec.*, 1921, **2**, 1–12.

The hormone theory at one time tended to an undue depreciation of the importance of the nervous control of the body. The primitive nervous system was evolved for defensive purposes, and the sym-

pathetic nervous system retains primitive features both structurally and functionally. There is a close association between the sympathetic nervous system and the endocrine glands as defensive mechanisms, and their action is reciprocal. The endocrines, gonads and sympathetic nervous system form a basic tripod entrusted with the defense of the individual and the continuity of the species. Endocrine glands may be influenced by toxic, nutritional and psychic factors, so that they may, alike, cause or be affected by a psychoneurosis.

S. W. Fernberger (Pennsylvania)

917. Pear, T. H., The Intellectual Respectability of Muscular Skill. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 163–180.

Kinesthesis has usually been classed with the lower senses and has not come in for much respect from the intellectuals. Individual differences in kinesthetic imagery are great. But this is true of all of the other modalities and people who possess a predominant kind of imagery are usually intolerant of others. For many individuals kinesthetic experiences recur in other modalities. A language describing movement is very difficult because most human movements are so very complicated, rapid and individually different. The slowed-up motion pictures are of great assistance in this study. But an improvement of the social and intellectual status of kinesthetic knowledge is noticeable.

S. W. Fernberger (Pennsylvania)

918. Cannon, W. B., New Evidence for Sympathetic Control of Some Internal Secretions. *Amer. J. of Psychiatry*, 1922, **2**, 15–30.

From the experimental evidence presented the conclusion is drawn that secretion of adrenin is evoked by asphyxia, by reflex stimulation and by emotional excitement, in an amount capable of influencing the viscera just as they are influenced by sympathetic nerve impulses. Sympathetic stimulation evokes from the liver not only a discharge of sugar but also a discharge of some elaborated unknown substance which has both cardio-accelerator and pressor effects. Electrical, vascular, and cardiac evidence coincide in pointing to a control of the thyroid through the sympathetic glands of the neck. The center controlling the adrenal medulla has been found, by experimentation, to be situated in the upper edge of the fourth ventricle—in the archaic

portion of the nervous system which is the common possession of all vertebrate forms. As yet no evidence has been found which points to any specific effect of the visceral changes on the conscious emotional experience. "May we not find these differential characters in the nervous pattern that lies ingrained in the archaic part of the neurone pattern?"

J. WALKER (Boston Psychopathic Hospital)

919. STURT, M., A Comparison of Speed with Accuracy in the Learning Process. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 289–300.

Attempt to determine whether in motor learning it is better to insist on speed or accuracy. The author found that if movements, such as are employed in typewriting, are learned slowly at first the length of the learning process is not thereby increased. If, during the learning, the attention is directed solely to accuracy the speed will gradually improve. If attention is directed solely to speed, the accuracy tends to diminish.

S. W. FERNBERGER (Pennsylvania)

920. MUSCIO, B., Motor Capacity with Special Reference to Vocational Guidance. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 157–184.

Some occupations require motor performances over and over repeated which require little strength and, after they have been automatized, little intelligence. Other occupations are predominately mental in nature. It is therefore important, for purposes of vocational guidance, to determine whether or not individuals are of predominately mental or motor types. The specific problem of this investigation is to ascertain if there are interrelations of different motor capacities such as those found in the positive correlations of mental tests. Aiming, tapping, tracing, steadiness and tests of that type were given to individuals of both sexes and of different ages. From his results the author concludes that there is no "motor type." Also motor capacities are relatively independent of intelligence. From the point of view of vocational guidance the author believes that every occupation which requires specific motor abilities will require specific motor tests.

S. W. FERNBERGER (Pennsylvania)

921. Russell, S. B., The Evolution of Nerve Muscle Mechanisms. *J. of Compar. Psychol.*, 1921, **1**, 395–412.

In a highly speculative story of the origin and development of neuromuscular mechanisms in living organisms, the author makes plenteous use of analogies gathered from many sources, notably from chemistry, physics, and mechanics, and not infrequently from the domains of the household. The concepts used relate to carbon and oxygen union, energy, energy discharge (explosion), intermittency of explosion after the fashion of gasoline engines, outer and inner zones of matter in the organism (the outer two becoming the sensory and motor zones and the inner one becoming the central nervous system), walls and check walls, the perforated burner of the home gas cook stove, "signal" lines, line junctions, "guard" junctions, "association" lines, signal centers, and head centers. A diagram is presented to schematize and clarify what the author is talking about.

H. R. Crosland (Oregon)

922. Sands, I. J., and Blanchard, P. Some of the Psychological Mechanisms of Human Conduct. *Ment. Hyg.*, 1922, **6**, 498–521.

A conventional survey of instinct and emotion in relation to problems of mental hygiene. Suggestions as to activities of a mental clinic in connection with the schools.

R. H. Wheeler (Oregon)

923. Bond, E. D., Internal Secretions and the Family. *Ment. Hyg.*, 1922, **6**, 522–525.

A rich satire on "glandology," offering to the reader a few minutes of delightful recreation. Cleverly done.

R. H. Wheeler (Oregon)

6. ATTENTION, MEMORY AND THOUGHT

924. Witmer, L., What Is Intelligence, and Who Has It? *Sci. Monthly*, 1922, **15**, 57–67.

Intelligence is the ability to solve a new problem, but no one has ever devised a test that tests this and nothing else. Education does not really strengthen intelligence but rather supplies intellectual habits. What the world needs to-day is more of the optimism of the progressive and less of the pathological fear of the standpatter.

J. F. Dashiell (North Carolina)

925. Davies-Jones, C., "Forgetting." *J. of Ment. Sci.*, 1922, **68**, 263–265.

Two cases are cited of examples of the forgetting in the psychopathology of everyday life. These cases were treated by the Freudian psychoanalytic method of free association and the reason for the forgetting was eventually discovered.

R. E. Leaming (Pennsylvania)

926. Peterson, J., Learning When Frequency and Recency Factors Are Negative. *J. of Exper. Psychol.*, 1922, **5**, 270–300.

Author reports a study in maze learning in which factors of recency and frequency were exactly balanced against themselves as far as positive and negative effects were concerned. Since the subject was sent back to the starting point at the commission of each error, the probability of a correct choice became increasingly less at each successive blind in the maze, and the impressions resulting from the frequency and recency of wrong choices militated, therefore, against the learning of the maze. From the fact that in learning the maze the subjects' errors were eliminated in the forward direction, whereas in other forms of maze learning where factors of recency and frequency are not balanced against themselves elimination of errors is in the opposite direction, author argues that, contrary to those doctrines coming down from early associationistic psychology, the factors of recency and frequency in the modified form of mental maze play no rôle in the act of learning. Learning must be attributed, rather, to a cumulative process in the afferent nerve impulses which, being reflected up through cortical synapses out to efferent nerve paths, exercises a directive influence on the nerve impulses which subsequent stimuli initiate.

C. C. Pratt (Harvard)

7. SOCIAL FUNCTIONS OF THE INDIVIDUAL

927. Anderson, L. O., A Preliminary Report of an Experimental Analysis of Causes of Stuttering. *J. of Applied Psychol.*, 1921, **5**, 340–349.

A group of normals, "ex-stutterers" and stutterers were given several tests including the foot-tapping, hand coördination, block test, two-dot test, visual imagery, complex reaction time, inhibition. The results show that stutterers have in the block test a distinctly poorer memory span for movements than normals. No reliable dif-

ference is found between stutterers and normals as to speed or as to number of false reactions in the complex reaction time test. Stutterers do not show, in this situation, any more instability or variability of reactions in the complex reaction time test than do normals.

E. MULHALL ACHILLES (Columbia)

928. TURNER, E. M., The Testimonial as an Advertising Appeal. *J. of Applied Psychol.*, 1922, **6**, 192–197.

An attempt was made to determine the value of the testimonial method of advertising from the viewpoint of the permanency of the testimonial writer's interest and belief in the worth of the article advertised. Does the writer of a testimonial continue to believe in the worth of the article he first recommended? Does he answer the letters of those requesting advice? The business house for whom this study was made has 279 testimonials in eight different pamphlets. Of the 279 testimonials 53 were written before the year 1916, 85 in 1916, 97 in 1917, 44 during or since 1918. A letter was written stating that the writer had noted that he or she was an enthusiastic user of the article advertised and would appreciate his advice about it. A stamped envelope was enclosed. Mr. was signed to all letters addressed to men and Miss on all to women. Only 49.4 per cent of the replies were favorable; 6.7 per cent would discourage the potential buyer and 43.9 per cent failed to bring forth a response and made no selling appeal whatever. The more recently written testimonials were more effective than the older ones. One hundred eighty-eight, or 67.4 per cent of the 279 testimonials, were written by men, 82 or 29.4 per cent by women, 9 or 3.2 per cent by representatives of institutions. It was noted that 57.9 per cent of the men and 56.1 per cent of the women answered the letter, requesting advice, favorably. Of the 18 doctors who first recommended the article only 44.4 per cent wrote favorable replies, as compared with 49.8 per cent of 261 people other than doctors, 22.2 per cent of the unfavorable replies written by others than doctors.

E. MULHALL ACHILLES (Columbia)

929. JONES, E. S., Effect of Letters and Syllables in Publicity. *J. of Applied Psychol.*, 1922, **6**, 108–204.

It is evident that the effective and memory value of different letter and syllable forms can be experimentally studied to the advantage of applied psychology. Results from the preliminary ex-

periments agree with opinions expressed—forms involving "l" and "r" tend to be pleasing, "t" "d" are preferable to the "g" and "k", "v" and "s".

E. MULHALL ACHILLES (Columbia)

930. FILTER, R. O., An Experimental Study of Character Traits. *J. of Applied Psychol.*, 1922, **5**, 297–317.

A trait must be defined in order to be studied intelligently. A table is given to illustrate an attempt at definition. This table includes "situations," "reactions other factors being equal," "negative responses." Experiments were conducted and conclusions as follows, drawn: Fair positive correlations show some constancy of speed and decision. The large majority of individuals tested can not be classified as either quick, slow, or mediocre. Only 10% of those tested may be characterized as quick, 8% mediocre, and 13% as slow. Group tests have inherent disadvantages for measuring this trait.

E. MULHALL ACHILLES (Columbia)

931. GATEWOOD, E. L., An Experiment in the Use of Music in An Architectural Drafting Room. *J. of Applied Psychol.*, 1922, **5**, 350–358.

To investigate the use of music in an architectural drawing room when the men are at work was the purpose of the research, the results of which are here reported. The draftsmen were given a problem every six weeks. An Edison laboratory model phonograph was used to supply music—vocal and instrumental. Fifty-six men replied to the questionnaire given them. Forty-nine said that the music made work easier. Instrumental music was preferred to vocal music. Music unfamiliar to the listener is not as desirable as familiar music. Music is not a feature to be used rarely as a sort of diversion or intermission but may be used to advantage along with work. Frequent short periods of music seem to be most desirable and beneficial.

E. MULHALL ACHILLES (Columbia)

932. BULLOUGH, E., Recent Work in Experimental Aesthetics. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 76–99.

Critical discussion of the work in experimental aesthetics between the years 1900–1914.

S. W. FERNBERGER (Pennsylvania)

933. Muscio, B., Feeling-Tone in Industry. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 150–162.

Attempt to determine whether or not the fatigue feelings of a group of individuals varies during the day. Such variation was found and the curves of diurnal variation corresponding certain striking ways to common industrial output curves. Hence these feelings of fatigue may be a very important factor in normal work.

S. W. Fernberger (Pennsylvania)

934. Sutherland, A. H., Correcting School Disabilities in Reading. *Elem. Sch. J.*, 1922, **23**, 37–43.

A description of several forms of backwardness in reading found among children together with a program of remedial measures.

A. I. Gates (Columbia)

935. Feasey, L., Some Experiments on Aesthetics. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 253–272.

Investigation to determine whether or not the basis of the aesthetic judgment is emotional. The psychogalvanic reflex was used to measure the emotional reaction. Simple rectangles and arrangements of geometrical figures were used as stimuli. The author found that the order of preference for colored rectangles differs markedly from that for uncolored, and also for surface rectangles substituted for outlines. The Golden Section holds a high place where the rectangles are uncolored. Bullough and Myers' four "perceptive types" were found in this experiment also. If the subject had the attitude of regarding the rectangles merely as formal arrangements of figures, they obtained a different result than when they had the attitude of regarding them as representations of objects or scenes. The attitude in each particular case was determined by both objective and subjective factors.

S. W. Fernberger (Pennsylvania)

936. Myers, C. S., Individual Differences in Listening to Music. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 52–71.

Continuation of a former study in which tuning fork tones were used as stimuli. In the present study a phonograph was employed and classical records played. Introspections were taken at the end of each record. For those most trained in music, an objective or technical attitude was present. For the less trained subjects, the

introsubjective and associative aspects were more pronounced. The subject's character was important in determining the associations and feelings which would appear. The importance of these phases in the appreciation of music is discussed.

S. W. Fernberger (Pennsylvania)

937. Bailey, P., A Contribution to the Mental Pathology of Races in the United States. *Ment. Hyg.*, 1922, **6**, 370–391.

A study of about 70,000 draft cases who were found mentally pathological in some way. Diagnoses were distributed as follows: around 31 per cent mentally deficient, 16 per cent psychoneurotic, 11 per cent psychoses, 10 per cent nervous diseases and injuries, 9 per cent constitutional psychopathic states, 9 per cent epilepsy, 7 per cent endocrinopathies, 3 per cent drug addicts, 2.7 per cent alcoholism. There follow several very interesting tables showing the relative data on the States of the Union which exceeded the average in mental deficiency; others showing the distribution of different mental diseases among 15 classified races.

R. H. Wheeler (Oregon)

938. Goldberg, J. A., Incidence of Insanity Among Jews. *Ment. Hyg.*, 1922, **6**, 598–602.

R. H. Wheeler (Oregon)

8. SPECIAL MENTAL CONDITIONS

939. Sumner, F. C., Psychoanalysis of Freud and Adler. *Ped. Sem.*, 1922, **29**, 139–168.

Every individual is duplex, with varying degrees of both masculine and feminine traits, possibly depending upon relative preponderance of masculine and feminine internal glands. On this basis, it is claimed that biologically and psychologically individuals fall into four types, M-f, m-F, f-M, F-m; and an elaborate list of corresponding psychic traits is offered. A study of the Freudian and Adlerian doctrines shows an extreme difference of fundamental type along these lines; the former being feminine, emphasizing the sex motive, womb, infantilism, repression, the unconscious, etc., the latter being masculine, emphasizing the will-to-power, compensation, security-tendency, the conscious, etc. It is claimed that the writings of Freud

and Adler include evidences of definite femininity and masculinity in their respective personalities.

J. F. DASHIELL (North Carolina)

940. DUNLAP, K., Reading of Character from External Signs. *Sci. Monthly,* 1922, **15**, 153–165.

The unfortunate effects of superficial work in the field of intelligence tests and the inadequacy of any tests of moral and emotional traits is made clear. Phrenology is referred to, and the various systems of character analysis by physiognomic details and patterns are shown to have no foundation in any biological scientific knowledge and to overlook the simplest rules of statistics and evidence. The financial success of promulgators of such systems is due to the usual lack of a checking up of some surprisingly good guesses by a few, which latter are explicable as analogous to many human judgments based on cues present but unrecognized.

J. F. DASHIELL (North Carolina)

941. PRINCE, M., An Experimental Study of the Mechanism of Hallucinations. *Brit. J. of Psychol., Med. Sec.,* 1922, **2**, 165–208.

By use of inducing hallucinations, by hypnotic methods, by subconscious automatic writing, the author studies the mechanism of hallucinations. There are types of visual and auditory hallucinations in which the imagery has its source in a dissociated mental process in which the subject is not consciously aware. It is due to the emergence into consciousness of the previously subconscious images. Hallucinations in the insane seem to be identical to this sort induced experimentally. The implications of this view for the study of the psychoneuroses is pointed out.

S. W. FERNBERGER (Pennsylvania)

942. YOUNG, J., Two Cases of War Neurosis. *Brit. J. of Psychol., Med. Sec.,* 1922, **2**, 230–236.

Description of a case of a "schemer" and of a case of anxiety neurosis. Dreams are described and prognosis and therapeutic methods given.

S. W. FERNBERGER (Pennsylvania)

943. SMITH, W. W., Experiments on the Association Test as a Criterion of Individuality. *Brit. J. of Psychol., Med. Sec.*, 1922, **2**, 121–130.

The experiments were performed to ascertain whether and to what extent, the distribution of affective tone evoked in the course of a word-association experiment is uniquely characteristic of the subject concerned. The author finds that individuals show marked and characteristic differences in the reactions they give to a suitably selected list of words. Under the conditions, individuals correlate with themselves much more highly than they do with each other. The importance of these findings are indicated.

S. W. FERNBERGER (Pennsylvania)

944. HINKLE, B. M., The Spiritual Significance of Psychoanalysis. *Brit. J. of Psychol., Med. Sec.*, 1922, **2**, 209–229.

The author shows that in psychoanalysis we have a method which has the power of awakening in the individual the very subjective experiences which are called spiritual, and which make for the kind of psychic growth and development that religion in all ages has aimed at calling forth.

S. W. FERNBERGER (Pennsylvania)

945. RIVERS, W. H. R., Methods of Dream-Analysis. *Brit. J. of Psychol., Med. Sec.*, 1922, **2**, 101–108.

It has been shown that the content as well as the analysis of a dream depends on the conditions under which the dream is obtained and also upon the theory of analysis in the mind of the dreamer. Rivers describes his method of self-analysis during a waking state in which he is able to think very clearly. The association method of analysis is criticised.

S. W. FERNBERGER (Pennsylvania)

946. FITZGERALD, G. H., Some Aspects of the War Neurosis. *Brit. J. of Psychol., Med. Sec.*, 1922, **2**, 109–120.

An article from the psychoanalytic point of view. The various kinds of war neuroses and their treatment and prognosis are discussed.

S. W. FERNBERGER (Pennsylvania)

947. JUNG, C. G., The Question of the Therapeutic Value of "Abreaction." *Brit. J. of Psychol., Med. Sec.*, 1921, **2**, 13–22.

Emphasis of the traumatic aetiology of neuroses which has been brought particularly to the fore by the cases of "war neuroses." Advocates a return to the Breuer-Freud therapeutic methods as well as to their theories.

S. W. FERNBERGER (Pennsylvania)

948. LONG, C., Mary Rose. A Study of the Infantile Personality. *Brit. J. of Psychol., Med. Sec.*, 1921, **2**, 68–80.

Analysis of Barrie's play Mary Rose from the psychoanalytic point of view. "Thus in the drama of Mary Rose the complete cycle of the problem of the infantile personality is put before us; nor, in my opinion, is the solution withheld."

S. W. FERNBERGER (Pennsylvania)

949. AVELING, F., AND HARGREAVES, H. L., Suggestibility With and Without Prestige in Children. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 53–75.

The following tests of suggestion were used: hand rigidity, by progressive lines, illusion of warmth, hand levitation by progressive weights, fidelity of report, and line lengths. Suggestion arises out of the total environment and conditions to which the subject is exposed. The suggestion may be either of a personal or impersonal sort. In cases of personal suggestion a negative response, owing to the development of contra-suggestion, is frequent. In cases of impersonal suggestion contra-suggestion is not so frequently aroused. There is evidence which points to a general factor of suggestibility complicated by group factors. General suggestibility is greatly modified by the specific conditions and elements of the whole situation, which vary in individual cases, according to experience of it and knowledge about it. There does not seem to be any correlation between suggestibility and other general factors such as general intelligence, perseveration, oscillation, motor dexterity and common sense.

S. W. FERNBERGER (Pennsylvania)

950. RIVERS, W. H. R., Affect in the Dream. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 113–124.

The author believes that dreams are attempts to solve in sleep conflicts of the waking life and that these attempts are of a more or

less infantile kind since in sleep only the earlier levels of mental functioning are active. Transformation has the effect to abolish or diminish the affective aspect of the conflict. When there is no transformation there is affect in the dream. This affect is painful when the conflict fails to satisfy the most prominent wishes of the dreamer and is pleasant when these wishes are satisfied. But in the majority of dreams the affective element is slight or absent because the struggle is transformed and the solution of the conflict is only of a symbolic kind. Rivers disagrees with the Freudian concept of the censorship as necessary to explain this transformation.

S. W. Fernberger (Pennsylvania)

951. Sturt, M., A Note on Some Dreams of a Normal Person. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 149–156.

Report in full of a series of dreams of a normal person. These dreams are of interest because she was fully aware of the conflict with which she was struggling.

S. W. Fernberger (Pennsylvania)

952. Thom, D. A., and Singer, H. D., The Care of Neuropsychiatric Disabilities Among Ex-service Men. *Ment. Hyg.*, 1922, **6**, 23–38.

R. H. Wheeler (Oregon)

953. Bailey, P., State Care, Training and Education of Mental Defectives. *Ment. Hyg.*, 1922, **6**, 57–67.

R. H. Wheeler (Oregon)

954. Matthews, M. A., One Hundred Institutionally Trained Male Defectives in the Community under supervision. *Ment. Hyg.*, 1922, **6**, 332–342.

R. H. Wheeler (Oregon)

955. Scott, A., Three Hundred Psychiatric Examinations Made at the Women's Day Court, New York City. *Ment. Hyg.*, 1922, **6**, 343–369.

R. H. Wheeler (Oregon)

956. Pratt, G. K., The Problem of the Mental Misfit in Industry. *Ment. Hyg.*, 1922, **6**, 526–538.

R. H. Wheeler (Oregon)

957. Bingham, T. A., The Psychiatric Work of the New York Probation and Protective Association. *Ment. Hyg.*, 1922, **6**, 539–574.

R. H. Wheeler (Oregon)

958. Massonneau, G., A Social Analysis of a Group of Psychoneurotic Ex-service Men. *Ment. Hyg.*, 1922, **6**, 575–591.

R. H. Wheeler (Oregon)

9. NERVOUS AND MENTAL DISORDERS

959. Kraepelin, E., Ends and Means of Psychiatric Research. *J. of Ment. Sci.*, 1922, **68**, 115–143.

The author gives a brief sketch of the founding of the German Institute for Psychiatric Research. He points out the need for such an institution at the present time and the fact that science is ready at this time to make contributions which could not have been made at an earlier period. He shows that attention has been directed primarily to the studying and classifying of symptoms of mental disease but that little progress, with one or two exceptions, has been made in discovering specific causes of mental disorders. The problems for investigation in the field of psychiatric research are complex in themselves and additionally difficult because of the fact that it is so nearly impossible to experiment with the brain of a living human subject. Furthermore, much psychological experimentation is needed on normal subjects to determine more clearly definite relations between brain function and mental expression. Problems in this field are important for the very progress of our civilization favors the appearance of morbid mental phenomena. Our civilization opposes the laws of natural selection by which the fittest alone survive and propagate and an ever-widening stream of inferior stock mixes itself with our offspring to the deterioration of the race. There is a question also whether the higher culture of a people may not itself directly favor the appearance of morbid mental phenomena.

Hitherto, a handful of experimenters in clinics and asylums in the midst of harassing daily tasks, found leisure for research. They had at their disposal insufficient space, slender means, and inadequate material and equipment. In all these directions the establishment and expected completion of the German Institute for Psychiatric Research will effect a change.

R. E. Leaming (Pennsylvania)

960. Burt, C., Note on the Mental After-Effects of Sleeping Sickness in School Children. *Brit. J. of Psychol., Med. Sec.*, 1922, **2**, 237–238.

Permanent effects, either physical or mental, are noted in 75% of the cases. The mental effects seem to be more significant. Children, after the disease seem to be frequently converted into mental or temperamental defectives. The eventual condition seems to depend on the severity of illness and on the age of the child when attacked.

S. W. Fernberger (Pennsylvania)

961. Barrett, A. M., The Broadened Interests of Psychiatry. *Amer. J. of Psychiatry*, 1922, **2**, 1–13.

"Psychiatry has gained the position of a liaison science between medicine and social problems." Its increasing scope brings increasing responsibility. Educationally it involves "bringing to public attention information that will make possible an appreciation of what produces disordered mental states and what measures can be taken to assure healthy mental development of mind and character. Psychiatric services should be included among other services in general hospitals. Facilities for psychiatric examination and treatment should be made readily available by increasing out-patient departments and traveling clinics. There is need of adequate psychiatric instruction in medical schools, and organized programs of research should be extended by institutions and individuals. The importance of affective influences and personality traits in behavior abnormalities should be emphasized that the present overemphasis of purely intelligence deficiencies may be properly checked.

J. Walker (Boston Psychopathic Hospital)

962. Rosanoff, A. J., Costs of a Social Service Department of a State Hospital vs. Economies Effected Thereby. *Amer. J. of Psychiatry*, 1922, **2**, 49–51.

The daily average number of patients on parole from the King's Park State Hospital for the year ending June 30, 1919, before the present large social service department was organized was 304; during the year ending June 30, 1921, after such organization, it was 669, showing an increase of 365. If the increased costs of the social service department ($9,914.54) is subtracted from 365 times the per capita cost of maintenance of patients for the year ending June, 1921,

($379.53), "we find the net saving, accomplished with the aid of that department during the year in question to be $128,613.91."

J. WALKER (Boston Psychopathic Hospital)

963. WELLS, L. F., AND KELLEY, C. M., The Simple Reaction in Psychosis. *Amer. J. of Psychiatry*, 1922, **2**, 53–59.

The article covers briefly the results of simple reaction time experiments in psychotics and presents original data on 37 cases which are distributed according to diagnosis as six manic-depressive excitements, seventeen manic-depressive depressions, five dementia precox, four general paralysis, one organic cerebral disease, four unclassified. These experiments accord with previous work in finding reaction times generally lengthened in psychosis. Individual differences are increased save in the schizophrenic group. The manic-depressive group alone shows a normally small amount of fluctuation of attention to the reaction process. The dementia precox group has a smaller sound-light ratio, the general paralytic group a larger sound-light ratio than the normal, to which the manic-depressive group closely approximates. In general, while normal performances in these functions are to be found individually under any diagnosis, markedly abnormal performances are more characteristic of malign conditions.

J. WALKER (Boston Psychopathic Hospital)

964. BATES, M., An Experiment with Simple Tests for the Insane. *Amer. J. of Psychiatry*, 1922, **2**, 61–65.

This is a preliminary report of 40 patients of the Worcester State Hospital who are to be reëxamined in four or five years that a comparison of their present performance on certain intelligence tests may be had. They have been selected as "having if not a slight hope of recovery at least some prospect of doing useful work about the institution." The tests used are discussed and various correlations between specific tests and age, types of disorder and attitude are stated in general terms.

J. WALKER (Boston Psychopathic Hospital)

965. ALFORD, L. B., A Defective Mental Makeup and the Pernicious Forms of Torticollis, Tinnitus, Neuralgia and Pruritus. *Amer. J. of Psychiatry*, 1922, **2**, 67–74.

The author states that the object of this communication is to indicate that the pernicious forms of tinnitus aurium and pruritus of the anogenital region, spasmodic torticollis and trigeminal neuralgia

may be similar in nature and to give the reason for this similarity. It is pointed out that with certain apparent exceptions they are alike as to age of onset, course, resistence to treatment, predominance of one symptom in clinical picture and central nervous origin. Gray's conception of a degenerative defect limited to a biological and physiological unit offers the best explanation of the pathogenesis of these forms of neurosis and gives the reason for their similarity.

J. WALKER (Boston Psychopathic Hospital)

966. READ, C., AND ROTMAN, D. B., Study of Institutional Escapes. *Amer. J. of Psychiatry,* 1922, **2**, 75–86.

Data concerning the age, birth, civil status, family ties, occupation, personal makeup, alcoholism, psychosis, length of time in the hospital before escape, mental condition and antisocial tendencies of 241 escapes from the Chicago State Hospital are presented by the writers. A composite picture is presented as follows: A man in the third or fourth decade; very possibly a foreigner; most probably a single man or one free from compelling family ties and rather given to alcoholic indulgence. The chances are that he would be a subsided case of dementia precox, a recovered or improved alcoholic, a rebellious paretic, or an improved case of "individual reaction" type. Only one time out of 20 would he be feebleminded and practically never a sexual pervert with criminal tendencies. He may have made prior escapes, but not more than one or two if he is to succeed in remaining out of the institution.

J. WALKER (Boston Psychopathic Hospital)

967. MYERSON, A., Anhedonia. *Amer. J. of Psychiatry,* 1922, **2**, 87–103.

Desire is fundamentally "an uneasiness brought about by coenesthetic tensions." "Anhedonia seems to be a kind of organic anaesthesia—a dropping out from consciousness of desire and satisfaction," and is characterized by a disappearance of energy feeling. The individual is susceptible to diffuse excitement which tends to have a disturbing and painful effect. The loss of the feeling of energy and the loss of the desire for food, drink and sex satisfaction has many causes. It occurs in post-infection conditions (typical after influenza) following surgical operations and pregnancy, during menopause in women and the involution period in the male. It occurs when purposes are blocked. "The most characteristic cases of anhedonia are seen as preliminary and early stages of mental disease." There are

cases which might well be called "idiopathic anhedonia" and individuals who appear constitutionally anhedonic. The technique of therapy must be to break the unhealthy habit as quickly as possible and to do this the "psychical reëducation and adjustment are not nearly as effective as drugs and physical therapeutics." "I fail to see that their (the psychoanalysts') claims are warranted by their results."

J. Walker (Boston Psychopathic Hospital)

968. Thalhimer, W., Epidemic (Lethargic) Encephalitis. Cultural and Experimental Studies. Second Communication. *Arch. of Neurology and Psychiatry,* 1922, **8**, 286–298.

Many investigators have studied the virus, organism, and the resulting lesions of lethargic encephalitis, and references to some of these studies are represented in this article. "The results of some experimental and cultural studies of epidemic encephalitis were reported in a preliminary communication and were believed to confirm the demonstration by Loewe and Strauss of a minute, filtrable organism as the cause of this disease. Additional material has been studied, and similar results have been obtained and are presented in this report." The findings of Maggiore and Sindoni, in their work on epidemic encephalitis, and of Flexner and Noguchi in theirs on poliomyelitis, have suggested the identity of these two diseases. Subsequent facts, however, militate against this view. The writer has presented the methods and findings of his study, methods of inoculation, cultures obtained both before and after necropsy, and the resulting lesions. "Some of the cultures were carried through 22 generations. Cultures were repeatedly filtered and the minute organism recovered from the filtrate." The article is illustrated with photomicrographs.

D. A. Macfarlane (Boston Psychopathic Hospital)

969. Cobb, C., Electromyographic Study of Paralysis Agitans. *Arch. of Neurol. and Psychiatry,* 1922, **8**, 247–264.

The apparatus used by the writer was the string galvanometer and a recording camera such as used for cardiographic work. The arrangements of the instruments, methods of application, type of electrodes, etc., are described. The eighteen cases which form the material for the study are presented. The electromyograms are presented and their characteristics discussed. The writer makes the following conclusions. (1) The tremor of paralysis agitans gives

a characteristic electromyogram, with large, slow waves at the time of muscular contraction, and smaller, more frequent waves between these tremor contractions. (2) The rate of the tremor of paralysis agitans is remarkably constant, the average being 5.8 per second. Little variation is observed in any one case when reëxamined months later. (3) In children the rate of the tremor may be much more rapid. (4) Scopolamin may stop the tremor, but does not seem to slow the rate when acting less completely. (5) Various muscles in the same person show practically the same rate tremor.

D. A. MACFARLANE (Boston Psychopathic Hospital)

970. CRAIG, M., Some Aspects of Education and Training in Relation to Mental Disorder. *J. of Ment. Sci.*, 1922, **68**, 209–228.

The margin between the sane and the insane is very narrow. In a given individual nothing more than exaggerated and uncontrolled normal characteristics may constitute mental disorder. Hypersensitivity, as a physical sign and as a condition affecting the mental processes, leads to unhealthy emotion, to preoccupation, to false reasoning. It heightens introspection and aggravates all the normal characteristics of the individual. It disturbs the relationship of self to surroundings and with this failure of adaptation a sense of inferiority or of irritation may result. Nature may rebel, in which case a psychical anesthesia results. The causes of hypersensitivity include physical diseases and disorders, defective sleep and the overaction of various mind processes. Laziness is an important symptom to be noticed in children and adults but especially in children. It is a proper mental reaction to a definite debilitated state of mind. The author takes up the importance in education and training of repression, as shown by Freud; emotion, home environment and training, punishment, shyness, fearlessness, and phantasy. He discusses the "introverted" and the "extroverted" child, and says that the goal of all mind training is self-discipline. He stresses emphatically the meaning of true self-discipline. He closes by stating that there is a great difference in innate mental endowment and that phrases like "equal opportunities for all" have a fascinating sound to the uncritical mind but if this assumed truth is carried into general practice this kindly attention will bring about the mental downfall of many of those for whom help is intended.

R. E. LEAMING (Pennsylvania)

971. Good, T. S., The Use of Analysis in Diagnosis. *J. of Ment. Sci.*, 1922, **68**, 229–236.

The author discusses at some length two cases, one diagnosed as neuresthenia, the other as hysteria. The method of psychoanalysis was employed and by its aid physical conditions were diagnosed which would otherwise have escaped notice altogether or remained partially understood. The key to the solution of the physical mischief lay repressed in the unconscious and in consequence could not be furnished in response to the usual methods of examination.

R. E. Leaming (Pennsylvania)

972. Rutherford, H. R. C., The Nature of the Psychopathic Inheritance. *J. of Ment. Sci.*, 1922, **68**, 236–245.

For nearly all time it has been recognized that heredity plays a prominent part in mental disease. The modern tendency is to minimize the importance of it as a causative factor. The statistics of a recent study made by the author disclose that heredity figured as a cause in 10 to 20 per cent of the cases. It is practically impossible to gain any real information as to the actual number of cases in which heredity is a causative factor because patients and relatives are so successful in concealing facts. The true inheritance in mental disease is one of instability. Instability is physical in origin and hypothyroidal in nature. The author gives examples of several families to illustrate the effects of treatment along these lines. The main problems in mental disease, the inborn mental defect, the various degenerations and infections, occur in individuals who have suffered from a deficient secretion of the thyroid.

R. E. Leaming (Pennsylvania)

973. Larguier des Bancels, M. J., L'Abime de Pascal. *Arch. de Psychol.*, 1921, **18**, 135–140.

From two sources, the letters of L'abbé Boileau and the biography of Marguerite Périer by Faugère, the author presents data concerning the origin and the development of Pascal's phobia of falling from precipices with its allied hallucinations. It is maintained that this celebrated case of phobia was really a case of fear of open places, and that it originated in childhood; but the author seems to feel that the Freudian explanation is inadequate. A parallel is drawn with the case of phobia described by Ernest Jones in the eighth volume of the *J. of Abnorm. Psychol.*

H. R. Crosland (Oregon)

974. Riggs, A. F., Nervousness: Its Cause and Prevention. *Ment. Hyg.*, 1922, **6**, 263–287.

A simple and reliable statement of the problem, based upon a clearer insight into psychology than is generally revealed by writers on nervousness. There are four outstanding causes of nervousness. First, a temperamental oversensitiveness to one's feelings and emotions and to pleasurable and painful situations. This cause may be detected early in childhood by certain biological symptoms such as blushing or blanching easily, overexcitability of the kidneys and sweat glands, greater than normal dependence upon praise. Secondly, there is a disturbance of balance of instincts and since emotions are the dynamic sources of energy of instincts there is likewise a disturbance of balance of emotions. Thirdly, a difficulty in realizing one's ideals either because they are unformed or fail in adequate expression due to instinctive and temperamental obstacles. Fourth, irregular development such as is found when intellectual development surges far ahead of the physical and moral or the physical ahead of the mental. Ten practical suggestions are offered for the prevention or alleviation of nervousness in adults.

R. H. Wheeler (Oregon)

975. Crawford, N. A., Mental Health and the Newspaper. *Ment. Hyg.*, 1922, **6**, 300–305.

Notes on the duties of the newspapers. Written by a journalist.

R. H. Wheeler (Oregon)

976. Potter, H. W., Personality in the Mental Defective, with a Method for its Evaluation. *Ment. Hyg.*, 1922, **6**, 487–497.

Here is presented a suggestive scheme, intended only to be a general aid in roughly estimating a patient's traits and adapted for use on feebleminded over seven years of age. The following main classes of traits are divided into subgroups: sense of responsibility, intellectual characteristics, industrial efficiency, amount of nervous and muscular energy, habitual reaction to inferiority, special adaptations such as amiability and sociability, socially unfavorable and antisocial traits, prevailing moods, traits of interest, etc., favoring specialized educational efforts, unique and pathological traits.

R. H. Wheeler (Oregon)

10. INDIVIDUAL, RACIAL AND SOCIAL PSYCHOLOGY

977. Barnes, H. E., The Progress of American Penology as Exemplified by the Experience of the State of Pennsylvania, 1830–1920. *J. of Crim. Law and Crim.*, 1922, **13**, 170–227.

The writer presents an historical account of the chief advances in penological concepts and practices with special reference to the state of Pennsylvania. The material is divided into eight sections: (1) The commutation of sentence for good behavior; (2) the indeterminate sentence operated in conjunction with a parole system; (3) the differentiation, separation and progressive classification of prisoners in accordance with a study of their personal history prior to commitment and their behavior in confinement; (4) the differentiation of the defective from the delinquent class and a proper specialization in the treatment of the latter; (5) careful psychological observation and analysis of the delinquent population; (6) sterilization or permanent segregation of habitual criminals; (7) the religious, moral, academic, vocational and social education of convicts; and (8) the introduction of preventive methods, such as probation, designed to avoid when possible the necessity of the expense and humiliation of imprisonment.

J. Walker (Boston Psychopathic Hospital)

978. Lind, J. E., The Cross-Examination of the Alienist. *J. of Crim. Law and Crim.*, 1922, **13**, 228–234.

The writer draws from his experience as an alienist "some of the high lights which may be of reminiscent interest to those who have been through the mill and serve as danger signals to those who seek experience of this sort under the impression that alienists receive big fees for a little pleasant work." The instances where and the methods by which testimony may be distorted and vitiated by the cross-examiner are of interest and of value to any one who with or without consent may be called upon to give such testimony.

J. Walker (Boston Psychopathic Hospital)

979. Alexander, J. P., The Philosophy of Punishment. *J. of Crim. Law and Crim.*, 1922, **13**, 235–250.

The writer discusses the evolution of theories of punishment for crime, involving motives of vengeance, retaliation, retribution or compensation, and of deterrence against repetition by the criminal or imitation by others. He points out that the modern trend must be

away from punishment for the crime and toward punishment to the extent of the criminal's responsibility, which varies greatly in individuals. He suggests specifically the indeterminate sentence, a perfected parole system, right of suspension of sentence in a proper case, limited pardoning power, administrative boards (bodies equipped to make expert study and report upon criminals), a more rational treatment of those in confinement, and a sense of responsibility for the family of the convict.

J. WALKER (Boston Psychopathic Hospital)

980. VOLLMER, A., Aims and Ideals of the Police. *J. of Crim. Law and Crim.*, 1922, **13**, 251–257.

To obtain a maximum of police protection at the lowest possible expense, better methods of selecting applicants must be established and training schools for police officers, better equipment, research departments, studies of the cause of delinquency, centralization of records and the systematic education of public must be effected.

J. WALKER (Boston Psychopathic Hospital)

981. DVORAK, H. D., and DVORAK, A., Commitment as Delinquent. *J. of Crim. Law and Crim.*, 1922, **13**, 258–265.

The writers present data from a study of 215 delinquent boys at the Sockanosset School, Rhode Island. Tabulations of chronological age and grade placements, chronological age versus mental age, mental age and grade placements are made and the conclusion is drawn that "the school for delinquent boys in Rhode Island is a nest of maladjustments."

J. WALKER (Boston Psychopathic Hospital)

982. SMITH, C. B., The Adequacy of Police Forces. *J. of Crim. Law and Crim.*, 1922, **13**, 266–271.

The writer points out that for adequate policing not only area, population and assessed valuation of property (which in the main are made the basis of comparative statistics) but racial elements, continuity of employment, special geographical and transportation factors, habits, traditions, etc., in a general way must be considered and such conditions in relation to requisite strength of police force must be standardized.

J. WALKER (Boston Psychopathic Hospital)

983. WEISS, C., A World Bureau of Prosecution—New Methods of Identification. *J. of Crim. Law and Crim.*, 1922, **13**, 272–274.

A discussion of ways and means to facilitate the apprehension both of criminals in foreign countries and international criminals. Particularly the organization of an international police congress is stressed. J. WALKER (Boston Psychopathic Hospital)

984. SMITH, M. H., The Medical Examination of Delinquents. *J. of Ment. Sci.*, 1922, **68**, 254–262.

The author takes up the remarkable change in status and duties of the prison medical officer of the present day and those of the prison medical man of the eighteenth century. He stresses the importance of a knowledge of insanity and mental defects for the medical officer dealing with delinquents since we now recognize that conduct is the direct result of mental life. He makes a plea for more medical officers for work with delinquents and for more training for these officers along the lines of insanity and mental defects. He would like to see a closer union between the asylum, the prison, the mental deficiency and the school services, looking toward one great universal, unified medical service.

R. E. LEAMING (Pennsylvania)

985. SUTTIE, I. D., Critique of the Theory of "Herd Instinct." *J. of Ment. Sci.*, 1922, **68**, 245–254.

When we speak of a "herd instinct" we mean an innate motive (conscious) or impulse (unconscious) determining social conduct, or at any rate regulating individualistic tendencies in such a way as to make social life possible or necessary. Such a conception is of considerable significance for medicine and in its psychosocial applications.

This paper aims to show that the conception of "herd instinct" *as an instinct* is unphilosophical, unscientific and unnecessary. To show that this concept is invalid it is necessary to demonstrate a difference in kind between the associative tendency and the instincts generally recognized as such.

The author defines and describes the term instinct and says that it is a biopsychophysiological term. He explains how it is used in the field of each of the three sciences involved. He shows that "herd instinct" has no definite and accepted meaning in psychology and physiology. The conception's value is surely purely descriptive and not suggestive or explanatory. We are asked to imagine an instinct without any special organ to originate and transmit stimuli

or to discharge its function or to be the intermediary between the germinal "anlage" and a psychic function. In the psychological field we are told that we may recognize the subjective side of "herd instinct" in the form of a craving for companionship. The social sentiments we are told develop from this impulse. But these sentiments do not occur in children, their development coincides in a noteworthy way with the establishment of the sexual function, their nature is complex and highly evolved (the very antithesis of the type of reaction we are accustomed to call instinctive), they are acquired with difficulty, are variable and are easily lost in disease. "Herd instinct" is a term lacking even descriptive validity as it is based on an arbitrary classification, imperfect observation, and several traditional assumptions which are quite fallacious.

Mind is social in origin and content and individuality is largely an illusion due to the complex interplay of cultural influences. Minds do not coöperate to form culture; they are not the units whose combination forms society, but are formed by society. Unless we reduce our conception of herd instinct to so general and aspecific a form that there will be no justification or use in regarding it as an instinct, we cannot explain why training and compulsion should be so conspicuous a feature of human social life.

The author formulates three alternative views of gregarious instinct. First, that it is really universal, but may lie latent. Second, that it denotes merely a type of behavior without implying any identity in the psychophysical mechanisms determining this. Third, the conception of "herd instinct" as analogous biologically, physiologically, and psychologically to sex, nutrition, etc., with the exception that it is a specific character of limited distribution. This is the view criticized and rejected in this paper, because the theory of "gregarious instinct" is formulated to solve a problem which is factitious and illusory; there is no structural integration of the gregarious instinct unlike instincts proper; subjectively the mere impulse to associate is not constant or definite enough to be indisputably distinguished from a possible sexual derivative or component; and we cannot account biologically for the distribution of the instinct determining the social habit. R. E. Leaming (Pennsylvania)

986. Jones, O. M., A Study of Juvenile Delinquency. *Sch. and Soc.*, 1922, **16**, 344–348.

A general article dealing with the causes of truancy and delinquency. Reference made to intelligence tests but no results given.

Conclusion drawn that "any group of delinquent boys will be found distributed as to intelligence in about the same proportion of bright, normal, dull or any other group of children." Delinquents suffer from emotional disturbances, improper environment and inadequate training rather than from physical ills or mental defectiveness.

R. PINTNER (Columbia)

11. MENTAL DEVELOPMENT IN MAN

987. THORNDIKE, E. L., An Instrument for Measuring Certain Aspects of Intelligence in Relation to Growth, Practice, Fatigue, and Other Influences. *J. of Exper. Psychol.*, 1922, **5**, 197–202.

In this paper Professor Thorndike states the relative difficulty, on the basis of average scores for college entrants, of fifteen alternative forms of a test similar in type to the army Alpha. Such a numerical evaluation of the relative difficulty of these tests enables one to measure certain aspects of intelligence as influenced by such temporal factors as growth, practice, and fatigue.

C. C. PRATT (Harvard)

988. HOLSOPPLE, J. Q., Reliability of Scores in Steadiness Tests. *J. of Exper. Psychol.*, 1922, **5**, 203–213.

In order to avoid the necessity of recording all the contracts of a subject in the eleven holes of a steadiness plate, one may secure a fairly reliable index of steadiness by recording the number of contacts in the last hole just before a maximum limit of fifteen touches is reached. The rating thus obtained correlates closely with that based on total contacts in all holes. Because of the fewer number of contacts to record, a telephone receiver seems more advantageous in this procedure than the kymograph.

C. C. PRATT (Harvard)

989. COLE, L. W., Prevention of the Lockstep in Schools. *Sch. and Soc.*, 1922, **15**, 211–217.

Gives some results of a new group intelligence test for kindergarten and first grade children. Shows what enormous differences in mental age exist in first grade children tested on the Binet or on the new group test. The mental age range is from 3.6 to 8.6. The average difference in mental age between the best and the poorest

pupil in the beginning class is 3.7 years. Classes formed on the basis of mental age accomplish far more than others when necessity forces a resort to half-day sessions. The author opposes classification according to I. Q. when intelligence is equal, because it becomes then a classification by means of chronological age. "It puts the younger children in the higher class."

R. PINTNER (Columbia)

990. THORNDIKE, E. L., The Abilities Involved in Algebraic Computation and in Problem Solving. *Sch. and Soc.*, 1922, **15**, 191–193.

Algebraic computation is not mechanical or merely a matter of memorizing some rules. It requires intelligence. If pupils are lacking in intelligence, what commonly happens is not that they learn to compute mechanically, but rather that they do not learn to compute at all. The correlations of problem solving and computation with intelligence show that algebraic computation involves very much the same abilities that problem solving does. The correlation between problem solving and intelligence for university students is about .66 and between computation and intelligence about .53. For a random sample of the population, carried on in school work, including algebra, to the age of eighteen, these correlations would probably be about .9 and .8 respectively. Algebraic computation is therefore emphatically an intellectual ability, although not so indicative of intellect as problem solving. It is far above the reproach of being a mechanical routine.

R. PINTNER (Columbia)

991. JONES, E. E., The Correlation of Visual Memory and Perception of Perspective with Drawing Ability. *Sch. and Soc.*, 1922, **15**, 174–176.

An attempt to discover the native powers peculiar to children who have art ability. A questionnaire sent to over 200 artists gives valuable information in the attempt to study the mind of the artist. It deals much with spatial relations, making fine judgments of size, form, shape, contour, etc. Art ability seems closely linked with esthetic appreciation. Tests of visual memory and perception of perspective given to seventh and eighth grade children show high correlations with drawing ability.

R. PINTNER (Columbia)

992. TOWNSEND, H. G., The Concept of Inferiority. *Sch. and Soc.*, 1922, **15**, 134–138.

Argues against the use of intelligence tests as branding a child "inferior." The story of a boy whose school work improved after hearing Madame Currie lecture is given as an illustration of the impracticability of prognosis by means of intelligence tests.

R. PINTNER (Columbia)

993. MADSEN, I. N., Intelligence as a Factor in School Progress. *Sch. and Soc.*, 1922, **15**, 283–288.

Presents evidence of the importance of intelligence as a factor in school progress. The Haggerty Intelligence Examination was given in grades III to VIII and the Army Alpha in high schools. Altogether 12,182 children were tested. Many distribution tables are given. The superiority in intelligence of the younger pupils over the older pupils in the same grade is strikingly demonstrated. The pupils in any grade who are the youngest chronologically are the oldest mentally, and conversely. Above grade VII selection on the basis of mental maturity seems more rigid than below that grade, and hence the rapid elimination from school in grades VIII and above. In order to receive special promotion a pupil must have a mental age of at least two years more than the grade which fits his chronological age.

R. PINTNER (Columbia)

994. BRIDGES, J. W., The Value of Intelligence Tests in Universities. *Sch. and Soc.*, 1922, **15**, 295–303.

Gives the results of a questionnaire sent out in 1920 as to the use of intelligence tests in universities. Finds a great many tests given, but relatively little use made of them for practical purposes. Gives correlations between tests and academic grades. The prognostic value of the tests is not high. Favors a more comprehensive psychological examination for special cases, but not for all students.

R. PINTNER (Columbia)

995. BATSON, W. H., The South Dakota Group Intelligence Test for High Schools. *Sch. and Soc.*, 1922, **15**, 311–315.

A group examination of six tests was given to 1453 high school students. Shows wide differences between schools and classes. Teachers grade according to the pupil material they possess and com-

parisons of different teachers' grades mean nothing. Boys planning to attend college do not rank as high as average of whole group. With girls the opposite is true.

R. PINTNER (Columbia)

996. MONROE, W. S., The Description of the Performance of Pupils on Exercises of Varying Difficulties. *Sch. and Soc.*, 1922, **15**, 341–343.

Tests having exercises of varying difficulties may be scored either by number correct by a total score based upon the weighted scores for each item of the test, such weights being determined by the relative difficulty of the different items. The same test scored in both these ways seems to give about the same results. A spelling test showed correlations of 96 and 97 between weighted and unweighted scores; a history test 87 and 91. It is, therefore, more economical and justifiable to describe the performances of pupils in terms of number of items done.

R. PINTNER (Columbia)

997. JOHNSON, J. B., Tests for Ability Before College Entrance. *Sch. and Soc.*, 1922, **15**, 345–353.

Examines the predictive value of high school marks, ability in freshman English themes, advanced studies in high school and intelligence tests with reference to work in college. Previous preparation is of greater predictive value than score on Alpha. If all four methods of evaluating the student are used, the predictive value becomes very great. Only one student among those whose records were low in all four respects was able to graduate from college.

R. PINTNER (Columbia)

998. SEASHORE, C. E., Sectioning Classes on the Basis of Ability. *Sch. and Soc.*, 1922, **15**, 353–358.

Advises that this be tried in colleges and universities in subjects such as English I, etc., where there are many sections. The basis for sectioning should be "a competitive test of capacity for doing the kind of work required in this specific course." General mental tests may be used as supplementary.

R. PINTNER (Columbia)

999. LAYTON, W. K., The Intelligence Testing Program of the Detroit Public Schools. *Sch. and Soc.*, 1922, **15**, 368–372.

Describes the scope and services of the psychological clinic of the Detroit public schools. The Detroit First Grade Intelligence Test has been given to about 11,000 children, and accelerated, normal and slow classes have been formed. Group tests are also given to average pupils and children who are candidates for special advanced classes. In addition about 10,000 have been examined by request of the schools themselves, generally for purposes of classification.

R. PINTNER (Columbia)

1000. BAGLEY, W. C., Educational Determinism; or Democracy and the I. Q. *Sch. and Soc.*, 1922, **15**, 373–384.

A criticism of the educational determinism which has developed from the present-day use of intelligence tests. The point at which intelligence seems to stop growing "has jumped back and forth over the chronological ages between thirteen and eighteen, like a veritable grasshopper." Mental growth is not only vertical but horizontal, and the possibilities of this horizontal growth are limitless. Hence a child's future education should not be determined by his I. Q. This would be undemocratic. Democracy must continue to give the common man a thorough education, because it is only by such means that his intelligence can be raised.

R. PINTNER (Columbia)

1001. SCOTT, W. D., Intelligence Tests for Prospective Freshmen. *Sch. and Soc.*, 1922, **15**, 384–388.

Now that mental alertness tests have been well established and can be easily and quickly administered, it is necessary for college administrators to raise the question as to the purposes for which they should be used. By means of the tests it might be easy to select students who are almost certain to be able to complete the present college course, and to eliminate all others. Elimination, however, should not be the main purpose of the tests. They should be given by experts "whose interest is in the welfare of the applicant, not in the success of any college program." A personnel director is necessary in the college to give advice and guidance to students.

R. PINTNER (Columbia)

1002. MOHLMAN, D. K., The Discriminative Value of the Subtests of a Group Intelligence Test. *Sch. and Soc.*, 1922, **15**, 399–400.

Discriminative value is measured by the correlation between the test and the total scale. Results of 77 university students are compared with the results for 986 school children on the Indiana Group Scale of Intelligence. The rank orders of the coefficients for the two groups are very dissimilar. Tests showing a high degree of value for testing the intelligence of immature subjects of varying mental ability are likely to be of little or no value for measuring adults of superior mentality.

R. PINTNER (Columbia)

1003. BREED, F. S., Shall We Classify Pupils by Intelligence Tests? *Sch. and Soc.*, 1922, **15**, 406–409.

Points out the discrepancy in classification among different intelligence tests. Three intelligence tests gave an average intertest correlation of .77. If, however, pupils are classified by two of these tests into three sections of equal size, the disagreement in classification amounts to 30 per cent of all the pupils. Such results call for great caution in the use of tests for classifying pupils. Emotional and volitional factors need to be taken into account.

R. PINTNER (Columbia)

1004. ARTHUR, G., Eliminating First Grade Failure Through the Control of Intellectual, Physical and Emotional Factors. *Sch. and Soc.*, 1922, **15**, 474–484.

Describes the tests given to 36 first grade children and their progress through the year. Individual assistance was given to several according to their needs. Many detailed case studies are reported.

R. PINTNER (Columbia)

1005. CHASSEL, C. F., The Results of the Thorndike Intelligence Examination in the Senior Class of the Horace Mann High School for Girls. *Sch. and Soc.*, 1922, **15**, 511–512.

Fifty-four students were tested and the scores are given. Interpretation of the scores show that 66 per cent could be safely admitted to college. An additional 28 per cent would probably attain a college degree if specially earnest or industrious. Only 6 per cent would prove unsuitable college material. Intelligence and teachers' ratings correlate .65.

R. PINTNER (Columbia)

1006. MITCHELL, D., Psychological Examination of Preschool Age Children. *Sch. and Soc.*, 1922, **15**, 561–568.

Reports intelligence tests of over one thousand children in the kindergarten and first grade. A distribution of the I. Q.'s is given, which shows a larger percentage of inferior I. Q.'s than Terman's distribution of unselected cases. The largest percentage falls between 80 and 89. The classification of children into sections in each school on the basis of I. Q. was recommended. One hundred and thirty-five children were recommended for retests because of language difficulty, incomplete test, no coöperation, and the like.

R. PINTNER (Columbia)

1007. DAGNEY, S., Intelligence Tests and Collegiate Selection. *Sch. and Soc.*, 1922, **15**, 593–595.

Reports of the results of several tests given to 558 students at Newcomb College. Intertest comparisons are given and the correspondence of test scores with academic grades is discussed.

R. PINTNER (Columbia)

1008. YEPSEN, L. N., A New I. Q. Slide Rule. *Sch. and Soc.*, 1922, **15**, 596.

Describes a slide rule for the calculation of the intelligence quotient.

R. PINTNER (Columbia)

1009. THORNDIKE, E. L., The Permanence of School Learning. *Sch. and Soc.*, 1922, **15**, 625–627.

A measurement of forgetting in algebra. Ability of college graduates, college entrants and high school pupils compared. The loss during four years from college entrance to first year in law school is approximately a reduction from ability to do four or five specific algebra examples to an ability to do only three. This may be compared with the median ability to do all five shown by the high school students. Such facts should prevent the very exaggerated notions of the loss of learning which are common to-day. How long it would take to recover ability once possessed is not known and should be investigated.

R. PINTNER (Columbia)

1010. WILSON, W. R., Mental Tests and College Teaching. *Sch. and Soc.*, 1922, **15**, 629–635.

Correlations between effort in academic work, as measured by time spent in study, and intelligence, are negative and fairly high, *e.g.*, —.29 and —.49. Effort and academic grade also give a negative correlation. Such a study shows why intelligence tests and grades fail to show high correlations. Students of the best native ability spend very little time in study. Raising the standard of the work will not remedy the situation because in order to make the brightest study, standards would have to be raised so high as to mean failure for half or three-quarters of the class. The only way to make all study up to capacity is to "motivate" the work of the class. Through such motivation correlations between grades and abilities have steadily risen in one department from 23 to 53, and are steadily rising.

R. PINTNER (Columbia)

1011. MCCORMACK, T. J., A Critique of Mental Measurements. *Sch. and Soc.*, 1922, **15**, 686–692.

Compares measurement in psychology with measurement in physics. Makes a sharp distinction between quantity and quality. Mental tests measure achievements and behavior and not mind. Then for achievement a number series, *i.e.*, mental ages, is substituted. Intelligence quotients are three degrees removed from the things they are supposed to measure. "They are knowledge of knowledge of knowledge, steadily increasing in emptiness." Then, again, the present measurements do not measure "the composite whole known as mind or intelligence." "The line of demarcation between native endowment and acquired power, between heredity and environment, cannot be definitely traced or permanently fixed."

R. PINTNER (Columbia)

1012. COBB, M. V., and TAPE, H. A., Note on a Method for Studying Causes of Increase in Alpha Scores. *Sch. and Soc.*, 1922, **15**, 706–708.

Suggests a method whereby amount of increase in score due to practice may be estimated and allowed for in different grades in a school where the same mental test is being given annually to all grades.

R. PINTNER (Columbia)

1013. Hollingworth, Leta S., Garrison, C. G., Burke, A., Subsequent History of E—— Five Years After the Initial Report. *J. of Applied Psychol.*, 1922, **6**, 205–210.

In the *Journal of Applied Psychology* for 1917 a report was made of the mental status and educational achievement of a boy, E., at that time eight years old. His I. Q. on first examination was at least 187 (Stanford-Binet) and he was in the sixth grade. In the school the median I. Q. of the pupils is about 116, median age for pupils in the sixth grade, eleven to twelve years. In 1920 E. took the Thorndike Mental Tests for entrance to Columbia College and the director of admissions states, "In the freshman test he was No. 2, out of 483 entering Columbia." He was then twelve years old, the median age of his competitors about eighteen years. He was admitted to Columbia College with the freshmen of 1920, with 14 points of advance credit toward the A.B. degree. In June, 1921, not quite thirteen years old, he had 46 points of academic credit toward the A.B. degree. He made 32 points in freshman year, maintaining consistently a grade of B except in two subjects. In physical education his rating was C. He attended summer school in 1921, making 5 points of A work. In September, 1921, his school status was the fourth semester college, his intellectual status Alpha Form 5, 194 points, his height 64.2 inches, his weight 166 pounds. The norm for that age is school status eighth grade elementary school, intellectual status 47 points, height 58.2 inches, weight 89.5 pounds. At eight years of age his I. Q. stood +11 P. E.; the probabilities are usually regarded as slight that cases beyond 5 P. E. will occur. E. wishes to be a minister and go abroad as a missionary.

E. Mulhall Achilles (Columbia)

1014. Hewes, A., and Others, Standardization of the Whipple-Healy Tapping Test. *J. of Applied Psychol.*, 1922, **6**, 89–112.

The study is a standardization of a test for measuring speed and accuracy of eye-hand coördinations. The central tendency was estimated for each age group in a total of 2253 children ranging in age from seven to seventeen years in order that the performances in any given case might be rated and used as one of a group of results on which to base vocational advice. The curves show that the girls tested have developed motor skill earlier than the boys, and that they maintain a small, but nearly constant degree of superiority until seventeen years is reached, when the boys overtake the girls. Then numbers tested are not sufficiently large to warrant generalizations

as to the relative ability of girls and boys in other performances of this kind. They indicate that the field would be a fruitful one for further research. E. MULHALL ACHILLES (Columbia)

1015. WHITCHURCH, A. K., Psychological Norms Among University Freshmen. *J. of Applied Psychol.*, 1922, **5**, 318–339.

The investigation was made on 100 freshmen at Northwestern University in 1916–17. The psychological tests used were easy directions, hard directions, African proverb, substitution. The professors of freshmen mathematics estimated the ability of the students. From the high school it was learned whether each student was in the first, second, third or fourth quarter for graduation. The following correlations were obtained: General intelligence and mathematics grade, .24; general intelligence and professor's estimate, .22; general intelligence and high school quarter, .36; mathematics grade and high school quarter, .55; mathematics grade and professor's estimate, .92; professor's estimates and high school quarter, .59.

E. MULHALL ACHILLES (Columbia)

1016. KUBO, Y., Revised and Extended Binet-Simon Tests, Applied to the Japanese Children. *Ped. Sem.*, 1922, **29**, 187–194.

A revision of the Binet-Simon series of tests including some adaptations from performance, Otis, and army tests, and ranging from two years to fourteen years inclusive, is given in detail, arranged from results of tests given 1200 Tokyo children.

J. F. DASHIELL (North Carolina)

1017. SAER, D. J., An Inquiry Into the Effect of Bilingualism Upon the Intelligence of Young Children. *J. of Exper. Ped.*, 1922, **6**, 232–240, 266–274.

Thirteen hundred children from seven to twelve years of age were examined in urban and rural districts of West Wales. The Stanford Revision was used, together with supplementary tests from Binet's 1911 scale and Burt's English revision. A Welsh translation was also given, and tests of rhythm and dextrality. In rural districts 80 per cent of the children speaking only one language were found to be as intelligent as 50 per cent of the bilingual children. According to the investigator, no factor except that of language was discovered which could be suspected of accounting for this difference. Urban children do not show these differences, but it is remarked that urban children whose mother tongue is Welsh tend to restrict themselves

more to English than rural bilingual children. Even in the urban districts, the monoglot subjects show a consistent superiority in tests involving vocal rhythms, and in knowledge of right and left.

H. E. JONES (Columbia)

1018. GREEN, J. A., Intelligence. *J. of Exper. Ped.*, 1922, **6**, 264–266.

If tests of mental ability fail to show a growth in intelligence after the year fourteen, this may be because they are essentially adapted to a puerile world. Intelligence increases in complexity as environments become more complex. Children, being dependent and protected, live in a fairly common medium; tests of intelligence measure the growth in efficiency of integration systems which develop within this common milieu. With adolescence, environments become more diverse and complex. The difficulty of intelligence tests after fourteen comes from the diversity of environments, to the demands of which intelligence is applied.

H. E. JONES (Columbia)

1019. BALLARD, P. B., The Limit of the Growth of Intelligence. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 125–141.

Tests consisting of 34 sentences containing absurdities to be detected through which were mixed four sentences of spurious absurdities were given to some 2000 subjects, the children varying in age from eleven to twenty-two years. The results show that after twelve years the curve for the growth of intelligence shows a very marked slowing-down and that after sixteen further growth is inappreciable. It follows that a year of mental age is not a fixed unit; it gradually diminished towards the higher end of the scale.

S. W. FERNBERGER (Pennsylvania)

1020. FOX, C., A New Method of Marking Group Tests. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 181–187.

Mental tests which attempt to ascertain an individual's mental age are too crude to be used for discriminating grades of excellence within a mental age. The test described was given to the children between eleven and twelve years in the Canbridge Borough to ascertain which of the children should be given higher education. Ten situations were given to the children, each followed by a question which could be answered by reasoning from the situation.

S. W. FERNBERGER (Pennsylvania)

1021. THOM, D. A., Habit Clinics for Children of Preschool Age. *Amer. J. of Psychiatry,* 1922, **2**, 31–42.

"The function of the habit clinic is to deal with those children who are developing during the preschool age undesirable methods of meeting the daily problems with which they are confronted, and to further the formation of habits that will tend toward the proper development of the child and its best interests at a time when methods of prevention rather than of cure can be utilized." The writer discusses factors at work in habit formation and presents several case histories which show the development of undesirable habit reactions and the importance of correcting such behavior before it becomes too fixed.

J. WALKER (Boston Psychopathic Hospital)

1022. HYDE, G. E., Recognition of Prepsychotic Children by Group Mental Tests. *Amer. J. of Psychiatry,* 1922, **2**, 43–48.

A survey of 15,000 school children of Utah below the fifth grade by the army Beta tests showed 5 per cent "subnormal," 20 per cent of this lower 5 per cent or 1 per cent of the total surveyed population the article affirms were in this group because of "nervousness and excitability." The presence of "nervousness" was detected by an "appropriate questionnaire" filled out by the teachers. The article does not state what criteria were used by the teachers in estimating "nervousness." The writer feels that the nervous child has a short span of attention and a long reaction period is required to restore metabolic equilibrium. It may be that synaptic connection does not occur, causing slow adaptation. Suitable group tests requiring graduated longer spans of attention can enable us to recognize school children who are nervous and unstable, thus paving the way for preventive work.

J. WALKER (Boston Psychopathic Hospital)

1023. BRADFORD, E. J. G., Factors in Mental Tests. *Brit. J. of Psychol., Gen. Sec.,* 1921, **12**, 279–281.

An attempt to demonstrate the possibility of a quantitative relation being established between groups of tests. Opposites, backward alphabet, forward alphabet, schema, ring and ring motor tests were given to 224 subjects. Degrees of correlation are given.

S. W. FERNBERGER (Pennsylvania)

1024. FILDES, L. G., and MYERS, C. S., Left-Handedness and the Reversal of Letters. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 273–278.

Report of the study of a markedly left-handed boy of six years of age who made peculiar use of and apparent preference for mirrored letters and numbers. Letters were read with equal ease either reversed or in normal position. He had the greatest difficulty in deciding which way the letters should go. Visual method of learning gave the greatest number of subsequent correct choices. Reversals occur when the learning was blindfolded and of a purely manual sort.

S. W. FERNBERGER (Pennsylvania)

1025. THOMSON, G. H., The Northumberland Mental Tests. *Brit. J. of Psychol., Gen. Sec.*, 1921, **12**, 201–222.

Description of a mental test designed to determine gifted children in the elementary schools worthy of free secondary education. The test booklet is reproduced and contains a number of tests so arranged that they may be given as group tests and easily scored after the examination. Several of the tests are new and others are older tests with a new arrangement. The maximum time is one hour. The results of some 2532 cases are given. Norms of performance are given and the correlation of scores with mental age in months is given as compared with the Binet I. Q. The scores of different types of city, country and suburban schools are compared.

S. W. FERNBERGER (Pennsylvania)

1026. THOMSON, G. H., Age Standards for the Separate Northumberland Tests. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 72–75.

Standardization by score for age of each of the six separate tests used in the Northumberland tests.

S. W. FERNBERGER (Pennsylvania)

1027. PHILLIPS, W., John Locke on the General Influence of Studies. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 1–25.

From a critical examination of the writings of Locke, the author believes that he never considered or advanced a theory of formal training in education. There is every indication that he believed that no mental process could be improved by training. He advocated a broad rather than a narrow educational training.

S. W. FERNBERGER (Pennsylvania)

1028. SPEARMAN, C., Recent Contributions to the Theory of "Two Factors." *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 26–30.

Criticism of the formula of G. H. Thomson which argued against the existence of a "general factor" in mental test results.

S. W. FERNBERGER (Pennsylvania)

1029. JONES, E., Some Problems of Adolescence. *Brit. J. of Psychol., Gen. Sec.*, 1922, **13**, 31–47.

Speculative discussion of differences between child and adult in which the author attempts to determine of what "growing up" consists. Intellectual development, differences in integration, emotion and imagination and sexual maturity are discussed. Adolescence, as the recapitulation of the phases of infantile sexual history is discussed from the psychoanalytic viewpoint and the influence of the differences just given and of the biological significance of puberty from this standpoint are treated.

S. W. FERNBERGER (Pennsylvania)

12. MENTAL EVOLUTION

1030. ATKINS, E. W., and DASHIELL, J. F., Reactions of the White Rat to Multiple Stimuli in Temporal Orders. *J. of Compar. Psychol.*, 1921, **1**, 433–451.

The multiple choice procedure, involving a temporal seriation of exits to food, was employed on six male and six female white rats. The apparatus consisted of a large dark runway issuing into four passageways, which were lighted in any desired order, one of which connected with a food box, and this was attached to any desired passageway. Closely adjacent to the dark runway, the experimenters had an observation box and a system of contacts for serially presenting electric lights in the four approaches to the food box. The problem was the ascertaining of whether or not rats can learn successfully to run the maze by temporal cues alone. The trials came twice daily—at the feeding periods—and consisted of about 100 preliminary and 400 regular trials per rat. It was found that none of the rats learned the problem and that almost no progress occurred after the 160th trial. A few rats formed position, or spatial, habits, and this fact hindered progress in temporal learning. The authors raise several interesting questions, and suggest other experiments. The

paper contains a cut of the apparatus, four tables in exposition of the technique and of the results, and fourteen graphs of learning curves.

H. R. Crosland (Oregon)

1031. Stone, C. P., Notes on Light Discrimination in the Dog. *J. of Compar. Psychol.*, 1921, **1**, 413–431.

Using the Yerkes-Watson brightness apparatus and Haggerty's control box, Stone sought to ascertain the brightness discrimination threshold in the dog. The dogs used were a cocker spaniel, two fox terriers, and a mongrel. Comparative data were obtained also from six human adults; and the data previously presented by Yerkes on the dancing mouse and by Tugman on the English sparrow were used comparatively. Well-learned habits of entering the discrimination chamber and returning by the alley opposite the standard light were established by means of punishment by electrically charged grill wires under the dogs' feet as preparatory measures to the experiments upon discrimination of small light differences. When the main experiments began the position of the standard, 1 c.p., light in relation to its comparison light was altered to prevent position habits, and this seriation of light positions was so arranged that the exposures in the two positions were equal in number. The results were briefly as follows: (1) The least differences from the 1 c.p. light at which 30 consecutive errorless discriminations were made were: female dog, 0.14 c.p.; male dog, 0.2 c.p.; two humans, 0.11 c.p.; a third human, 0.09 c.p. (2) The lowest differences which were clearly discriminated were: Female dog, 0.12 c.p., percentage of error 26.5, number of trials 75; male dog, 0.10 c.p., percentage of error 27.7, number of trials 90; two humans, 0.06 c.p., percentage of error 20.0, number of trials 45; the third human, 0.04 c.p., percentage of error 17.7, number of trials 45. (3) Humans excelled the lower animals and the dogs excelled the English sparrow and equaled the best of dancing mice.

H. R. Crosland (Oregon)

1032. MacDowell, E. C., Experiments with Alcohol and White Rats. *Amer. Nat.*, 1922, **56**, 289–311.

Beginning at the time of weaning alcohol was administered to white rats thirty minutes a day for seven consecutive days by the inhalation method. Then the treatment was varied according to the behavior of the animal, the alcohol fumes being given them until they

showed signs of becoming affected. This continued for fourteen days. Subsequently the rats were kept in the fumes until they became anesthetized. This required from three to four hours in some of the older subjects. These treated rats were then run through Watson's maze; tested by the multiple choice method; and records were kept of their fertility and weight. The same experiments and records were kept for a group of untreated rats. Results were as follows: Treated rats took more time in running the maze; they produced smaller litters, fewer litters and grew more slowly than did the untreated rats. Treated offspring from treated rats tended to take more time in the maze; bore smaller and fewer litters and grew slightly slower than the normals. Untreated offspring from treated rats differed from their controls as follows: they produced smaller litters but more litters; they took a very little longer in running the maze and were heavier. Untreated offspring in the second generation from treated rats also produced smaller but more litters; took a little more time in running the maze; and were somewhat heavier. Thus it turned out that the influence of alcohol was a complicated one. It seemed to modify the germinal material directly and played a selective rôle. The experiments had to be discontinued during the war but as far as results were obtained they clearly indicate need of more careful interpretation as to the effects of alcohol on the organism.

R. H. Wheeler (Oregon)

1033. Loeb, L., Inheritance of Cancer in Mice. *Amer. Nat.*, 1921, **55**, No. 642, 510–528.

An extensive study of 12,000 female mice yielded the following results: Cancer-rate in individual strains and families is relatively constant and consistent correlations appear between the rates of sub-strains and main strains of mice. If strains having a similar tumor-rate are crossed the offspring inherit a rate common to both parents, or the rate strikes a balance, or varying degrees of intermediary rates are observed. Multiple factors underlie the hereditary predisposition; the trait is not a recessive monohybrid. The age at which a tumor appears is characteristic of individual strains and is an inherited factor. Cancer is not a sex-linked character but this does not rule out the possibility that sex-linked characters may not enter as one of the multiple factors in the inheritance of the disease.

R. H. Wheeler (Oregon)

1034. CHIDESTER, F., Studies on Fish Migration. II. The Influence of Salinity on the Dispersal of Fishes. *Amer. Nat.*, 1922, **56**, 373–380.

R. H. WHEELER (Oregon)

1035. MCINDOO, N. E., The Auditory Sense of the Honey-Bee. *J. of Comp. Neurol.*, 1922, **34**, 173–200.

The special sound-producing apparatus of the honey-bee consists of membranes lying between the axillaries at the bases of the front wings. There have been five different organs described as acoustical in the honey-bee—pore plates, Forel flasks, pit pegs, and Johnston's organ, all located in the antennæ—but none of these are believed by the author to be fitted to act as sound receptors. Hearing, in insects, is presumably nothing more than response to mechanical jarrings, as was suggested in 1908 by Forel.

R. H. WHEELER (Oregon)

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